

Minutes of the meeting of the Quality and Patient Safety Committee of the Board of Directors of the Cook County Health and Hospitals System held Tuesday, January 17, 2012 at the hour of 12:00 P.M. at 1900 W. Polk Street, in the Second Floor Conference Room, Chicago, Illinois.

I. Attendance/Call to Order

Chairman Ansell called the meeting to order.

Present: Chairman David Ansell, MD, MPH and Directors Hon. Jerry Butler and Luis Muñoz, MD, MPH (3)

Mary Driscoll (Non-Director Member)

Absent: None (0)

Additional attendees and/or presenters were:

Shirley Bomar-Cole – System Deputy Chief
Operations Officer

Barbara Farrell – System Director of Quality and
Patient Safety

Claudia Fegan, MD – John H. Stroger, Jr. Hospital of
Cook County

David Goldberg, MD – John H. Stroger, Jr. Hospital of
Cook County

Aaron Hamb, MD – Provident Hospital of Cook
County

Helen Haynes – System Associate General Counsel

Terry Mason, MD – System Chief Medical Officer

Linda Rae Murray, MD – Cook County Department of
Public Health

Ram Raju, MD, MBA, FACS, FACHE – Chief
Executive Officer

Elizabeth Reidy – System General Counsel

Tanda Russell – System Interim Chief Nursing Officer

Deborah Santana – Secretary to the Board

Pierre Wakim, MD – Provident Hospital of Cook
County

II. Public Speakers

Chairman Ansell asked the Secretary to call upon the registered speakers.

The Secretary responded that there were none.

III. Report from System Chief Medical Officer

A. Update on transition activities for Oak Forest Health Center

Dr. Terry Mason, System Chief Medical Officer, provided an update on the following matters.

Review of Floor Plan – Oak Forest Health Center

Dr. Mason provided an update on the transformation of Oak Forest Health Center. He stated that efforts are well underway. There have been meetings with the architects; he reviewed some of the plans being considered.

III. Report from System Chief Medical Officer (continued)

Chairman Ansell inquired regarding the progress on the Regional Outpatient Center (ROC). Dr. Mason responded that, currently, they are working on the transition of Immediate Care Center to the E Building; he expects that they will be operational in the E Building by the first of February. He stated that the patient volume in the Immediate Care Center has decreased to approximately twelve to thirteen patients between the hours of 11:00 P.M. and 7:00 A.M.; this was anticipated, and will make the transition to the E Building easier. With regard to the ROC, Dr. Claudia Fegan, Chief Medical Officer of John H. Stroger, Jr. Hospital of Cook County, stated that services are being gradually added; nephrology services began to be provided there in June, and pain services began to be provided in September. Dr. Mason stated that they are in the process of trying to hire additional specialists, particularly the urologists. He added that they are going to move to a point-of-care testing so that Laboratory and X-Ray services that were being done twenty-four hours per day/seven days per week, can be discontinued. Dr. Mason noted that targets have not yet been met with regards to increasing volumes in other areas; meetings to address this subject are planned.

Death of youth while in custody at the Juvenile Temporary Detention Center (JTDC)

Dr. Mason reviewed some of the details surrounding the death of a youth while in custody at the JTDC over the weekend; this involved a sixteen year-old young man who collapsed after playing basketball and became without pulse or blood pressure. A team was urgently called; the young man was transferred to Stroger Hospital, where he was pronounced dead. The autopsy is still pending; Dr. Mason stated that he hopes to receive more information once the autopsy has been concluded.

Re-Start Program

The Re-Start Program, a month-long healthy living program that includes weekly meetings, started this year at the beginning of January; this year's program includes smoking cessation. The community response to this healthy living initiative continues to grow. Dr. Mason stated that there were 425 attendees at the first meeting; the second meeting's attendance totaled 850. The meeting scheduled for tonight is expected to draw 1,000 attendees.

IV. Report from System Interim Chief Nursing Officer

Tanda Russell, System Interim Chief Nursing Officer, provided an update on nurse staffing. She stated that there were a significant number of retirements in the month of December that impacted the nursing units. A Med-Surg planning committee was convened to look at bed closures; twenty-four to twenty-eight beds in the Med-Surg units were closed to reduce the nurse-patient ratios.

The ultimate priority over the next three to four weeks is to aggressively recruit for nursing at all levels to support the re-opening of those beds. Some additional orientation sessions have been held for agency staffing, and management has been working closely with the unions to implement some internal shift changes, so that beds can be re-opened.

This has created some impact on the Emergency Department. Dr. Fegan noted that this has pushed management to take a further look at throughput issues. In response to a question from Chairman Ansell regarding the time to onboard a new employee, Ms. Russell stated that once the decision has been made to hire an individual and an offer has been made and accepted, it generally takes forty-five to sixty days to complete the process (which includes credentialing, background checks, etc.); she noted that they are working with Human Resources to try to expedite that process.

V. Report from System Director of Quality and Patient Safety**A. System Quality and Safety Dashboard (Attachment #1)**

Barbara Farrell, System Director of Quality and Patient Safety, presented the quarterly System Quality and Safety Dashboard. The Committee reviewed and discussed the information.

i. Quality report from the Cook County Department of Public Health (Attachment #2)

Dr. Linda Rae Murray, Chief Medical Officer of the Cook County Department of Public Health, presented the Quarterly Quality Report, which included information on the following matters: Public Health Accreditation Process, and Report on Childhood Lead QI Process. Also included in the information and review was Item VI(B), the study in collaboration with the University of Illinois School of Public Health, regarding Access to Trauma Care in Southern Cook County; an executive summary of the Trauma Report was included in the information provided in the Quality Report. The Committee reviewed and discussed the information.

ii. Quality report from Provident Hospital of Cook County (Attachment #3)

Dr. Aaron Hamb, Chief Medical Officer of Provident Hospital of Cook County, and Dr. Pierre Wakim, President of the Executive Medical Staff of Provident Hospital of Cook County, presented the Quarterly Quality Report, on Emergency Services – Identifying Opportunities for Improvement. The Committee reviewed and discussed the information.

VI. Recommendations, Discussion/Information Items**A. Continuing Education - Presentation on Illinois Hospital Report Card database**

Mary Driscoll, Division Chief of Patient Safety and Quality at the Illinois Department of Public Health (IDPH), provided an overview of the Illinois Hospital Report Card database; this is a web-based IDPH public information tool that provides quality information on Illinois hospitals.

B. Review of study in collaboration with the University of Illinois School of Public Health, regarding Access to Trauma Care in Southern Cook County (Attachment #4)

This item was reviewed during Item V(A)i, with the Quality Report presented by the Cook County Department of Public Health.

C. Reports from the Medical Staff Executive Committees**i. Provident Hospital of Cook County****ii. John H. Stroger, Jr. Hospital of Cook County**

Dr. David Goldberg, President of the Executive Medical Staff of John H. Stroger, Jr. Hospital of Cook County, stated that he did not have a report to present at this time.

VI. Recommendations, Discussion/Information Items**C. Reports from the Medical Staff Executive Committees (continued)**

Dr. Wakim noted that most of his report was included in the quality report presented earlier in the meeting. He stated that at the recent meeting of the Executive Medical Staff, the Cerner full implementation at Provident Hospital was discussed; he thanked Tom Dohm, Interim Chief Operating Officer of Provident Hospital of Cook County, for taking leadership on this matter. Dr. Wakim stated that the election of the new officers occurred last week. Following are the election results: Dr. Wakim – President; Vice President - Dr. McPearson; Secretary - Dr. Anwer Hussain; and Treasurer - Dr. Billingsly.

VII. Action Items**A. Minutes of the Quality and Patient Safety Committee Meeting, November 15, 2011**

Director Butler, seconded by Director Muñoz, moved to accept the Minutes of the Quality and Patient Safety Committee Meeting of November 15, 2011. THE MOTION CARRIED UNANIMOUSLY.

B. Any items listed under Sections VI, VII and VIII**VIII. Closed Session Item****A. Medical Staff Appointments/Re-appointments/Changes (Attachment #5)**

Note: the Committee did not recess the regular session and convene into closed session.

Director Muñoz, seconded by Director Butler, moved to approve the Medical Staff Appointments/Re-appointments/Changes. THE MOTION CARRIED UNANIMOUSLY.

IX. Adjourn

Prior to adjournment of the meeting, an issue that occurred recently was presented by Ms. Driscoll, relating to a pregnant patient who had believed she was in labor, and was waiting in the Emergency Department at Stroger Hospital, without being immediately seen. Ms. Driscoll thought that pregnant patients were to go directly to Labor & Delivery for immediate care, and not be routed through the Emergency Department. Shirley Bomar-Cole, System Deputy Chief Operations Officer, stated that the expectation is that pregnant patients who are deemed to be in active labor are to go directly to the fourth floor. She stated that she will review the matter to further investigate, and will report the findings back to the Committee.

Director Butler, seconded by Chairman Ansell, moved to adjourn. The motion carried unanimously and the meeting was ADJOURNED.

Respectfully submitted,
Quality and Patient Safety Committee of the
Board of Directors of the
Cook County Health and Hospitals System

XXXXXXXXXXXXXXXXXXXXXXXXXXXX
David Ansell, MD, MPH, Chairman

Attest:

XXXXXXXXXXXXXXXXXXXXXXXXXXXX
Deborah Santana, Secretary

Cook County Health and Hospitals System
Minutes of the Quality and Patient Safety Committee Meeting
January 17, 2012

ATTACHMENT #1

Quality and Patient Safety

Committee of the Board of Directors CCHHS

January 17, 2012

Barbara Farrell, RN, MS, MJ

System Director Quality, Safety, Accreditation & Regulatory

Overview

- ▶ Dashboard Report

CCHHS Quality & Safety Dashboard

QUALITY	National Target	IL Target	QTR 4 CY-2010		QTR 1 CY-2011		QTR 2 CY 2011		QTR3 CY-2011	
Core Measures			Stroger	Provident	Stroger	Provident	Stroger	Provident	Stroger	Provident
Acute Myocardial Infarction (AMI)										
AMI-1 Aspirin at Arrival	99%	99%	98.4%	100%	100%	100%	100%	100%	100%	No Cases
AMI-2 Aspirin Prescribed at Discharge	99%	99%	100%	100%	100%	100%	100%	100%	100%	No Cases
AMI-3 ACEI or ARB for LVSD	96%	97%	90%	No Cases	100%	100%	100%	No Cases	100%	No Cases
AMI-4 Adult Smoking Cessation Advice/Counseling	96%	100%	100%	No Cases	100%	100%	100%	100%	100%	No Cases
AMI-5 Beta-Blocker Prescribed at Discharge	98%	99%	98%	100%	98.2%	100%	100%	100%	96.5%	No Cases
AMI-7a Fibrinolytic Therapy received within 30 minutes of arrival *	V 0.9191	75%	No Cases	No Cases	No Cases	No Cases	No Cases	No Cases	No Cases	No Cases
AMI-8a Primary Percutaneous Coronary (PCI) within 90 minutes of arrival *	V 1.0	92%	33.3%	No Cases	75%	No Cases	100%	No Cases	100%	No Cases
Heart Failure (HF)										
HF-1 Discharge Instructions *	V 1.0	91%	64.9%	97.9%	71.2%	100%	70.4%	100 %	62.5%	98%
HF-2 Evaluation of LVS Function	98%	99%	98.7%	100%	98.6%	100%	100%	100%	100%	100%
HF-3 ACEI or ARB for LVSD	95%	95%	93.9%	96.3%	95.8%	100%	100%	100%	100%	100%
HF-4 Adult Smoking Cessation Advice/Counseling	99%	99%	100%	100%	100%	100%	100%	100%	100%	100%
Pneumonia (PN)										
PN-2 Pneumococcal Screen & Vaccination	94%	93%	41.7%	100%	58.3%	50%	75%	50%	69.2%	100%
PN-3b Blood Culture performed in the ED Prior to Initial Antibiotic Received in the Hospital *	V 1.0	96%	95.1%	77.5%	95%	94.4%	94.4%	94.4%	86.5%	100%
PN-4 Adult Smoking Cessation Advice/Smoking	98%	98%	100%	100%	100%	100%	100%	100%	100%	100%
PN-5c Initial Antibiotic Received Within 6 hours after Arrival	96%	96%	63.7%	92.7%	84.4%	95.2%	81.0%	95.2%	61.8%	91.7%
PN-6 Initial Antibiotic Selection For CAP in Immunocompetent patient *	V 0.9958	91%	69.7%	87.9%	80.6%	100%	83.3%	100%	57.9%	100%
PN-7 Influenza Vaccination	91%	91%	80.6%	100%	79.3%	No Cases	No Cases	No Cases	No Cases	No Cases
<div>Below 80%</div> <div>80% & above</div> <div>Meets Benchmarks</div>										

Below 80%

80% & above

Meets Benchmarks

CCHHS Quality & Safety Dashboard

QUALITY	National Target	QTR 4 CY-2010		QTR 1 CY-2011		QTR 2 CY-2011		QTR 3 CY-2011	
	CMS	Stroger	Provident	Stroger	Provident	Stroger	Provident	Stroger	Provident
Readmissions-30 day (AMI)	19.9%		0%		0%	20.5%	0%		
Readmissions-30 day (Heart Failure)	24.7%		7.92%		4.41%	24.4%	26.3%		
Readmissions-30 day (Pneumonia)	18.3%		0%		0%	22.3%	19.1%		
Patient Satisfaction (HCAHPS) Value Based	CMS								
*Overall Rating of Hospital *	82.52%	51%	44%	52%	49%	52%	57%	53%	54%
Communication w Nurses *	84.70%	62%	66%	61%	70%	67%	70%	64%	73%
Communication w Doctors *	88.95%	79%	80%	81%	78%	83%	81%	79%	76%
Responsiveness Hospital Staff *	77.69%	50%	53%	50%	53%	49%	53%	51%	53%
Pain Management *	77.90%	65%	58%	61%	59%	67%	70%	61%	61%
Communication about Medicines *	70.42%	58%	73%	57%	60%	56%	60%	57%	55%
Cleanliness & Quietness *	77.64%	53%	59%	49%	59%	51%	62%	51%	67%
Discharge Information *	89.09%	77%	75%	78%	77%	78%	78%	81%	67%
Hospital Infections (NHSN)									
Central Line associated Infections ICU per 1000 line days	NHSN 2.2	2.9	0	0	0	3.7	Not Applicable	2.5	Not Applicable
Mortality									
AMI Mortality	16.2%**				0%	16.2%	Not enough cases		
CHF Mortality	11.2%**				0%	9.0%	10.1%		
Pneumonia (PN) Mortality	11.6%**				0.0%	11.7%	10.3%		
* HCAHPS questions are scored as a percent of patients who answer with the top rating ("definitely yes"), not a mean score									
Mortality is a risk adjusted annual number									

Cook County Health and Hospitals System

Nursing Quality Dashboard

QUALITY /Safety	Target	QTR 4 CY-2010		QTR 1 CY-2011		QTR 2 CY-2011		QTR 3 CY-2011	
Nursing Indicators		Stroger	Provident	Stroger	Provident	Stroger	Provident	Stroger	Provident
Falls with harm incidence (per 1000 pt. days) IHI (Institute Healthcare Improvement)	2.9	2.37	.33	1.91	0	2.29	0	1.57	0
Hospital Acquired Pressure Ulcer Incidence IHI (Institute Healthcare Improvement)	Zero	2.8	0	2.5	0	3.04	0	3.6	0
Restraint Prevalence-Med Surg	7%	*	.09%	1.29%	0.03%	.5%	0	1%	0
Restraint Prevalence-Critical Care		*	7.2%	32.5%	Not Applicable	22%	Not Applicable	24.6%	Not Applicable
Ambulatory	Target			QTR 1		QTR 2		QTR 3	
% of up-to-date pediatric immunizations in children at 24 months (Hedis/NCQA)	72%			77%		84%		76%	
% of diabetic patients (age 18-65 years) who have had one HBA1c in the last 12 months(Hedis/NCQA)	81%			96%		90%		90%	
Patient Satisfaction (Press Ganey) Mean		ACHN		ACHN		ACHN		ACHN	
Friendliness/Courtesy of Nurse/Nursing Assistant	81.0	78.7		78.4		79.5		79.4	
Concern of Nurse/Nursing Assistant for Problem	78.0	75.1		73.6		74.8		76.0	
Overall Nurse Satisfaction	80.0	76.9		75.8		77.4		77.9	

Does not meet benchmark

60% & above

Meets Benchmark

Cook County Health and Hospitals System
Minutes of the Quality and Patient Safety Committee Meeting
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ATTACHMENT #2

Cook County Department of Public Health

**Report to Board Quality Committee
January 17, 2012**



**Cook County Department
of Public Health**

Agenda for Report

- Public Health Accreditation Process
- Report on Childhood Lead QI process
- Report on Trauma Services in Southern Suburbs



**Cook County Department
of Public Health**



Goal of Accreditation

- The goal of the national public health department accreditation program is to improve and protect the health of the public by advancing the quality and performance of state, local, tribal, and territorial public health departments.



Steps: PHAB Public Health Accreditation Board

7. Reaccreditation

6. Reports

5. Accreditation Decision

4. Site Visit

3. Documentation Selection & Submission

2. Application

1. Pre-application





Next Steps

- Submission of Statement of Intent – first quarter 2012
- Submit application – second quarter 2012
- Training, collection, review and submission of documents – first quarter 2013
- Site visit – determined by PHAB
- Achieve Accreditation – 2013



Application Prerequisites

- Submit 3 prerequisites *(Approved by CCHHS Board & Cook County Board of Commissioners in June 2011)*
 - Community Health Assessment (WePlan 2015)
 - Community Health Improvement (WePlan 2015)
 - CCDPH Strategic Plan 2015
- PHAB training of Accreditation Coordinator



Public Health Accreditation Domains





Domain 12

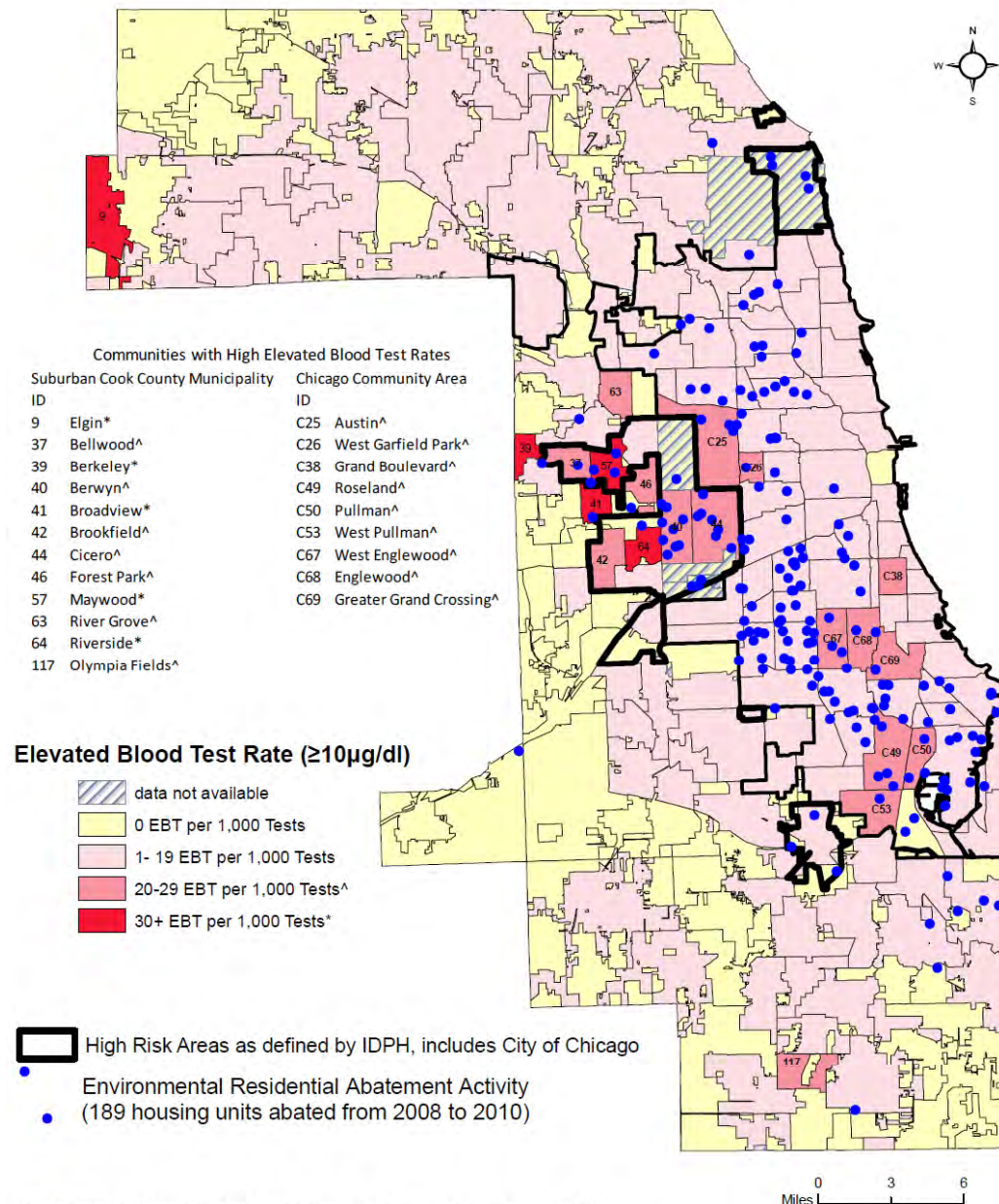
- Build a strong and effective relationship with **governing entity**.
 - Cook County Department of Public Health **two** governing entities:
 - Board of the Cook County Health and Hospitals System
 - Board of Health: established by resolution, elected Cook County Board of Commissioners

Childhood Lead Poisoning Project Overview



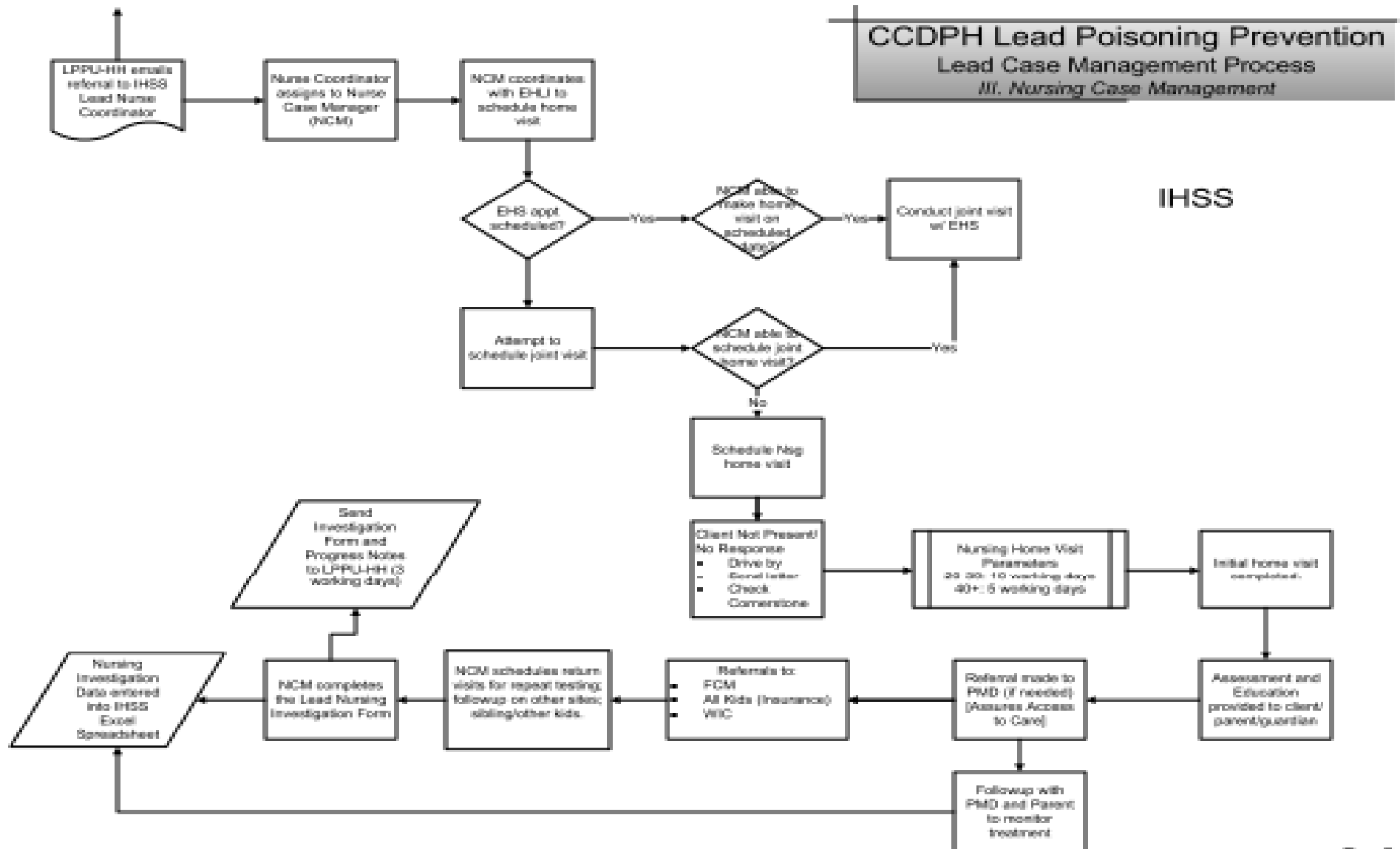
- Attempt to implement some process improvements in lead poisoning case follow up from initial screening through case resolution.
- This includes actions by all three units involved in lead case management – LPPU, EHS, IHSS
- PROGRAM:
 - Identification of children with elevated blood lead levels (EBLs)
 - Case management of children with EBLs
 - Remediation of housing to eliminate the source of lead

Child Lead Poisoning in Cook County (Children 6 years of age and younger)
Cook County Department of Public Health, Lead Poisoning Prevention and Healthy Homes Unit
Elevated Blood Testing Rates and Abatement Activity
2008-2010

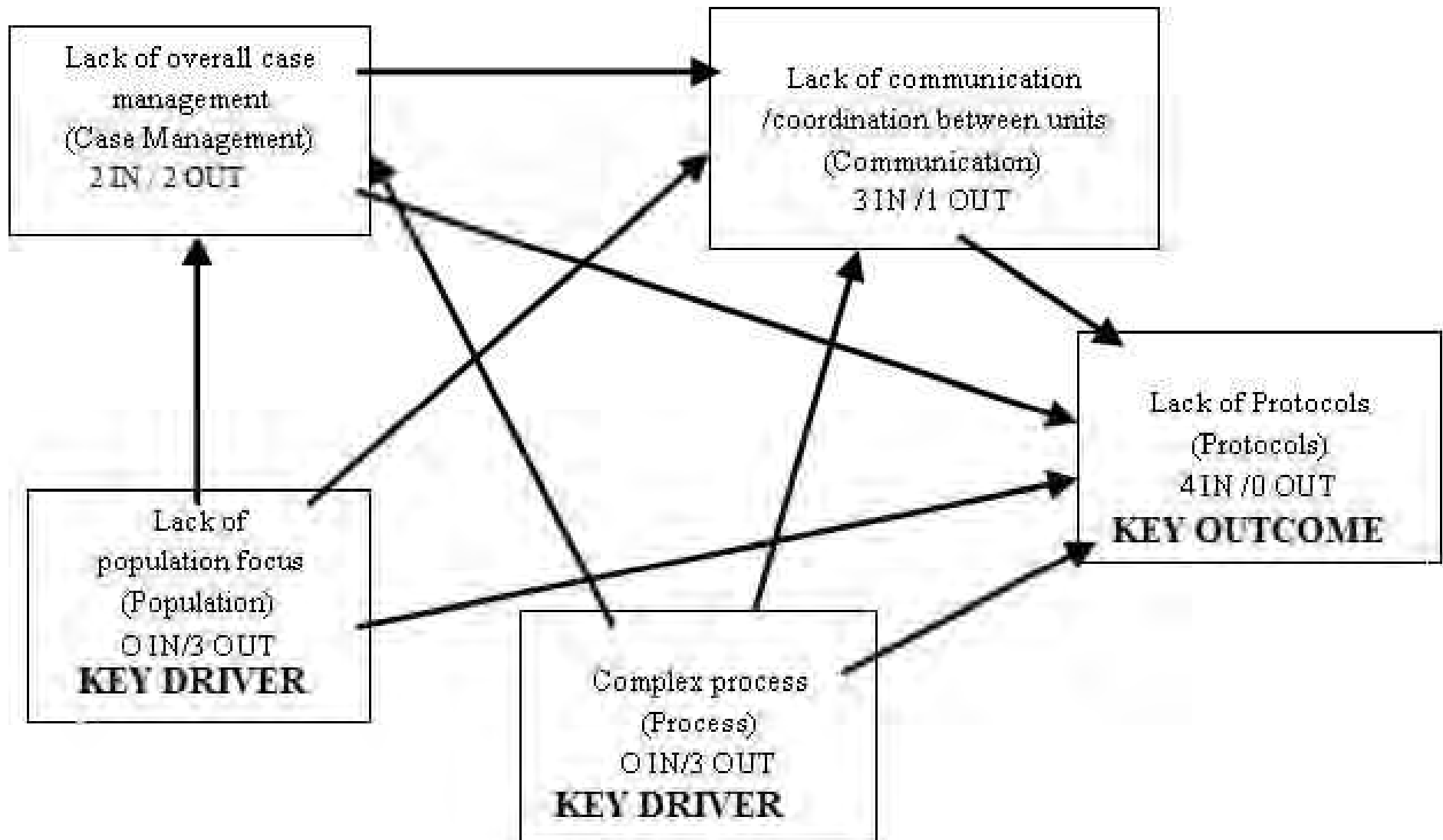


Cook County Department of Public Health, Epidemiology Program Office

Childhood Lead Poisoning



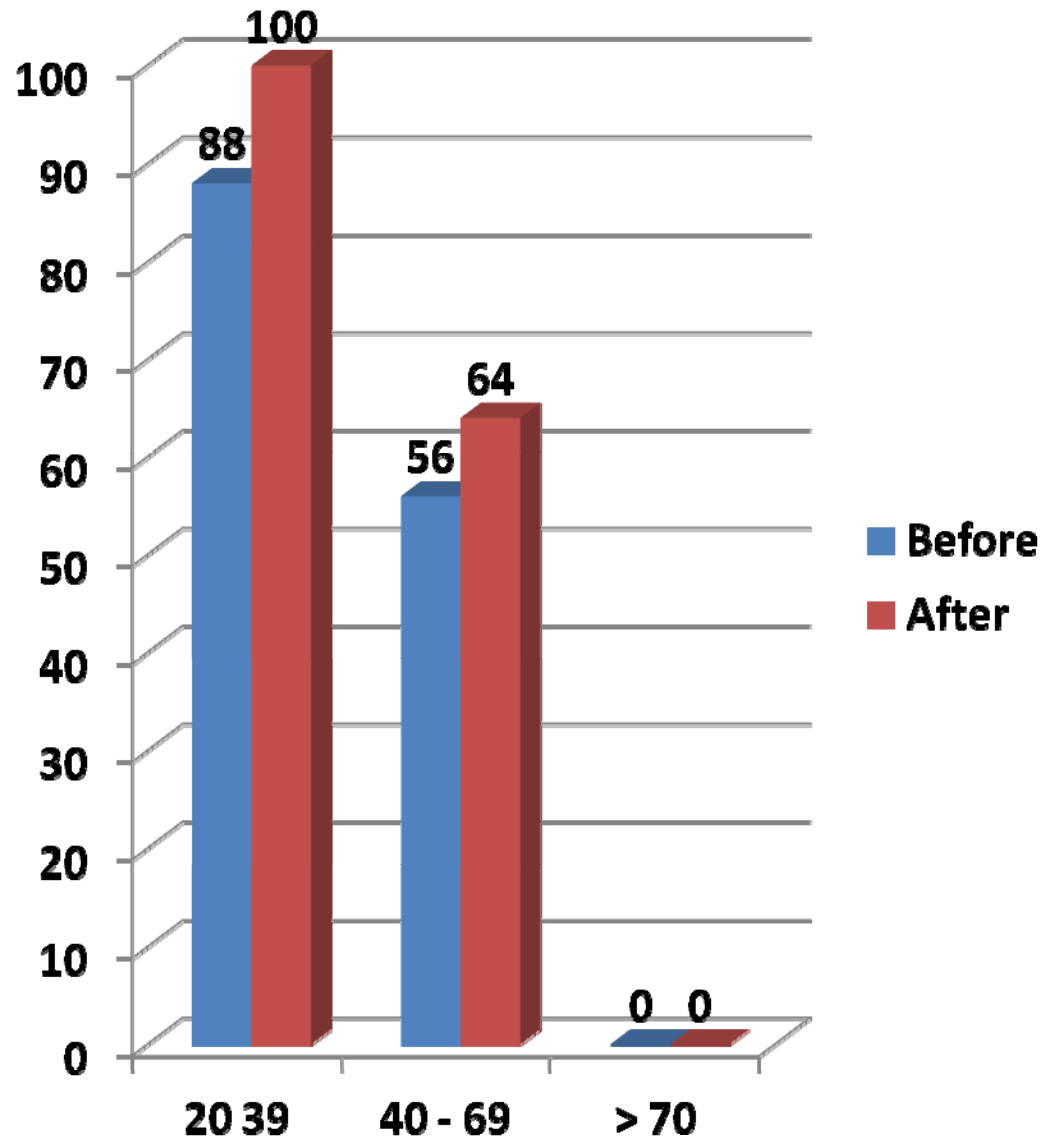
Childhood Lead Poisoning



Childhood Lead Poisoning – Comparing data Before & After changes (August 2011)

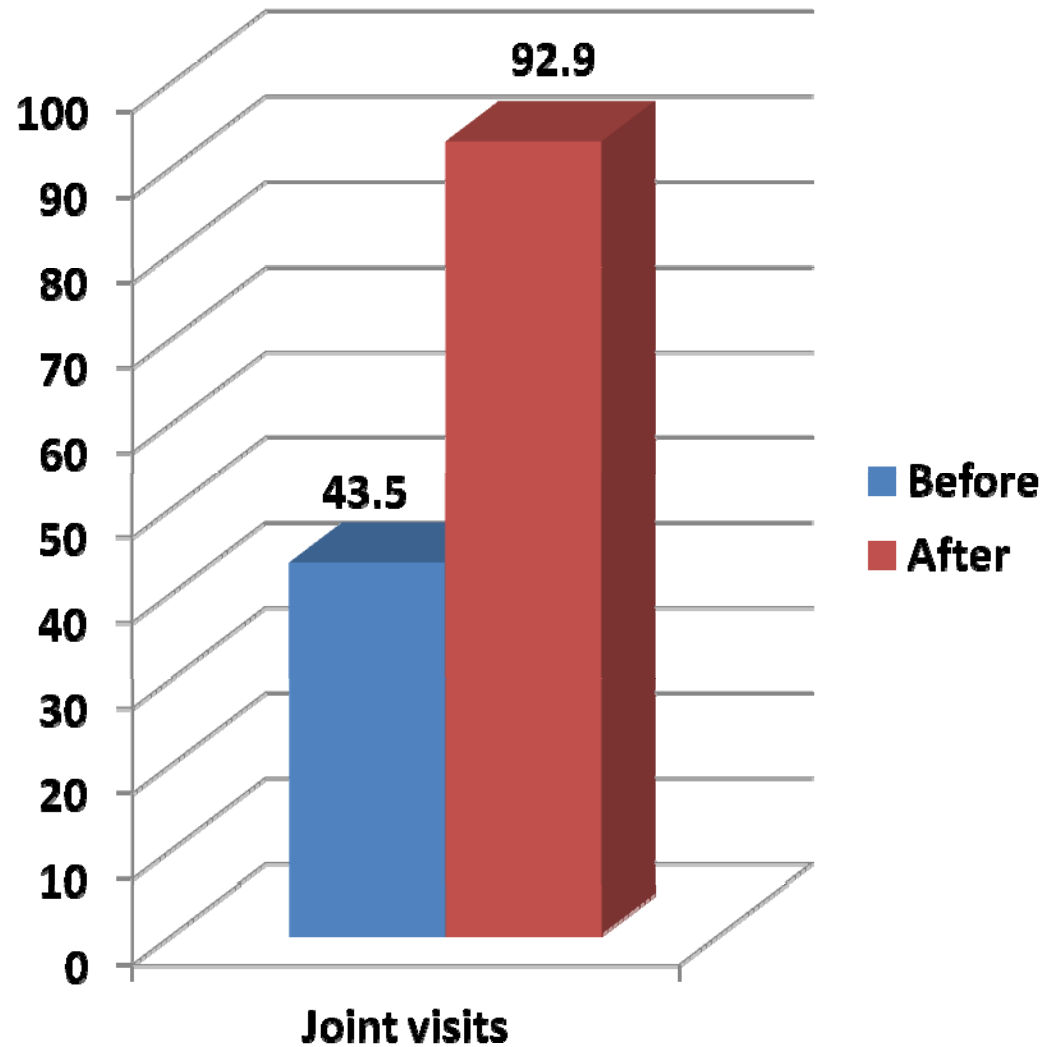
BENCHMARK: 100% of cases will be visited within the time periods below –

Elevated Blood Lead (EBL)	
20 – 39	within 10 days
40 – 69	within 5 days
> 70	within 2 days



Childhood Lead Poisoning – Comparing data Before & After changes (August 2011)

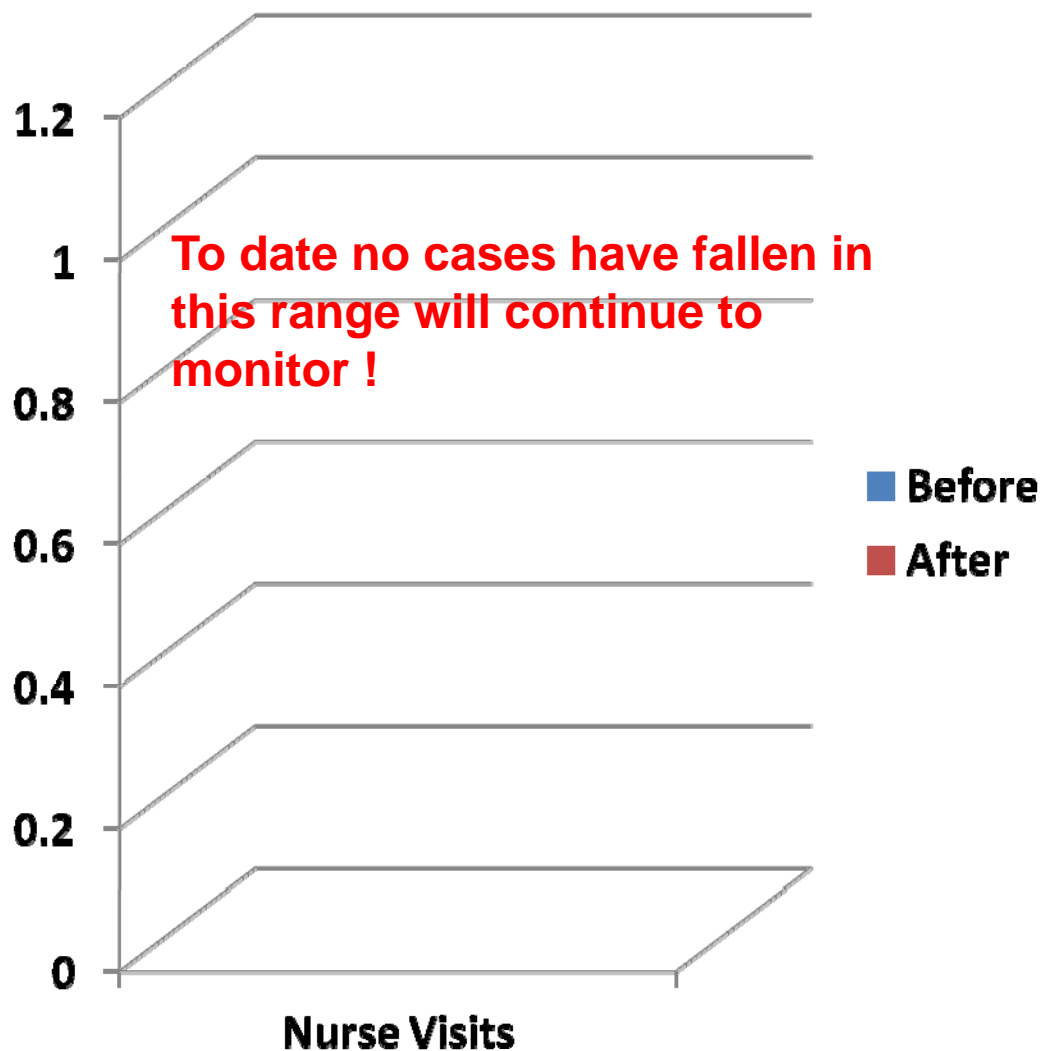
BENCHMARK: 100% of Elevated Blood Lead children with levels 20 or greater will receive a JOINT home visit from Environmental and Nursing.



Childhood Lead Poisoning – Comparing data Before & After changes (August 2011)

CHANGE IN PROTOCOL: For cases where no source of lead could be identified OR where child lead levels do NOT drop:

A nurse visit will be conducted





Executive Summary Trauma Report

Project Management Team and Advisory Board (alphabetical order)

- Susan Avila, RN, MPH, John H Stroger Cook County Hospital
- Faran Bokhari, MD, John H Stroger Cook County Hospital
- James Doherty, MD, Advocate Christ Hospital
- Thomas Esposito, MD, MPH , Loyola Hospital
- Linda Forst, MD, MPH, UIC School of Public Health
- Gary Merlotti, MD, Mt. Sinai Medical Center
- Linda Rae Murray, MD, MPH, Cook County Department of Public Health
- Renee Partida, RN, MPH, John H. Stroger Cook County Hospital
- Roxanne Roberts MD, John H Stroger Cook County Hospital
- Steve Seweryn, EdD, MPH, Cook County Department of Public Health
- Robert F. Smith, MD, MPH, John H Stroger Cook County Hospital

Executive Summary

Trauma Report

- ***Question:***

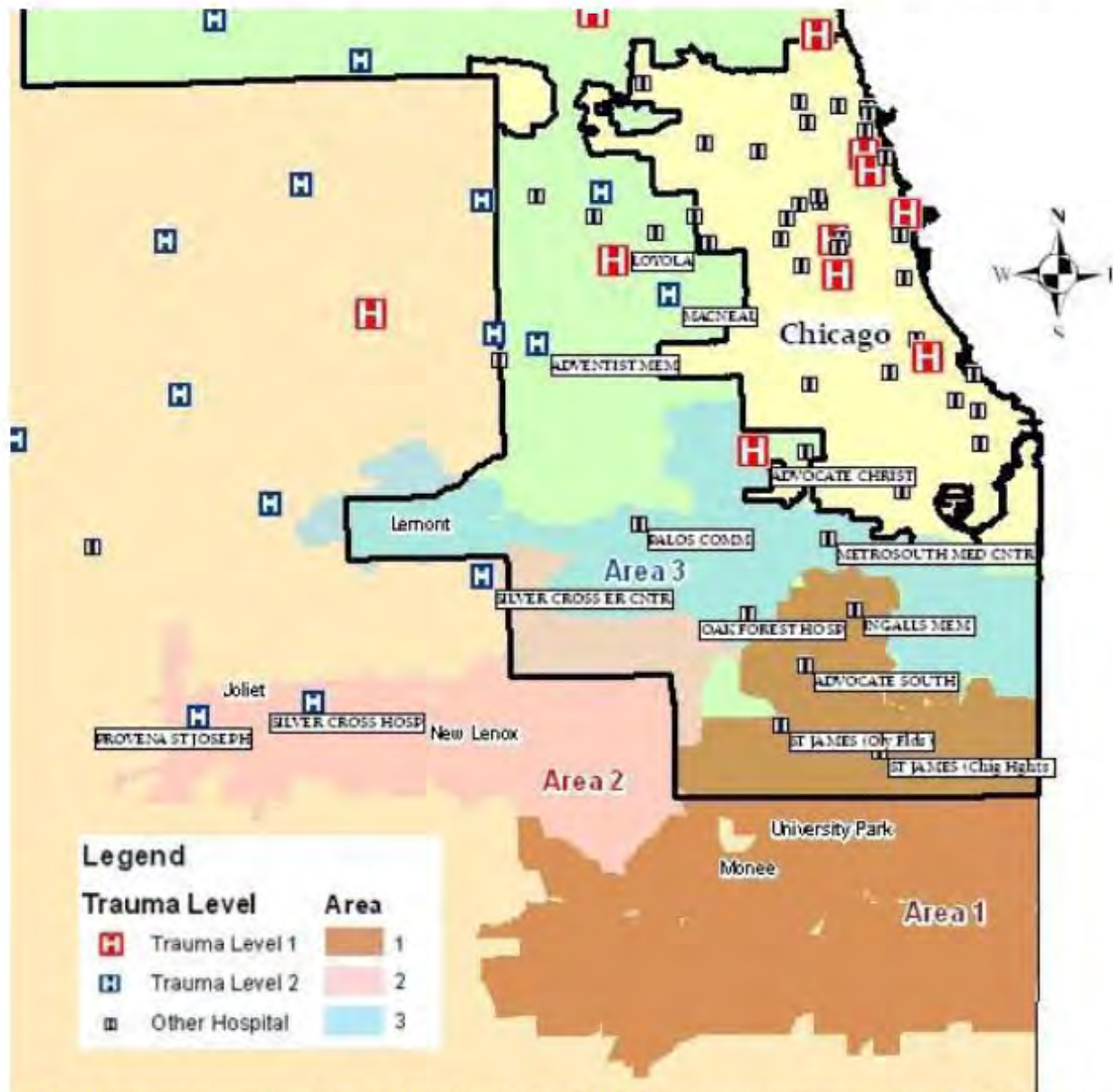
- St. James Hospital in Olympia Fields closed its Level 1 Trauma Unit July 1, 2008. Has this had an adverse impact on the provision of trauma care in southern Cook County.

- ***Study Design:***

- Examined three existing databases. (IDPH :Emergency Medical System Pre-Hospital and the Trauma Registry. And the IHA Hospital Discharge database.) We used probabilistic data linkage methods to link two of the three databases -- the Hospital Discharge database and the Trauma Registry -- to help identify trauma patients treated in both specialized trauma units and general emergency rooms.
- We conducted comprehensive descriptive, spatial, temporal and multivariable analyses of acute traumatic injuries occurring in the affected communities, in order to determine where trauma patients were treated after the closure of the St. James Olympia Fields Hospital trauma unit and whether patients from Olympia Fields the catchment area had more adverse outcomes after the closure.
- Key personnel were also interviewed to clarify trauma system issues in the affected region, to decide on appropriate outcomes to measure, and to assist in interpreting the results.

Executive Summary Trauma Report

St. James Olympia Fields Hospital trauma unit Catchment Area (Figure 1)



*The unincorporated areas inside the St. James Olympia Fields Hospital catchment are cover approximately 7,500 residents.

Executive Summary

Trauma Report

- **Conclusions**

- Although there were **no immediate adverse effects (for one year out)** , Advocate Christ Hospital has picked up the majority of seriously injured patients that previously would have been treated at Olympia Fields. Advocate Christ Hospital is the only facility with specialized trauma care within the Southern Cook County area. The system is not static, population shifts and changes to factors that are associated with injury -- traffic patterns, poverty, crime, aging populations -- may result in long term effects missed by this analysis.

Executive Summary

Trauma Report

- Recommended policy changes to improve and safeguard the regional trauma system in Southern Cook County:
 - 1. Create a centralized ambulance service in Southern Cook County**
 - 2. Develop pathways to facilitate coordination and planning between hospitals with specialized trauma units independent of trauma region**
 - 3. Create a system in Illinois to designate hospitals as level III and IV trauma units**
 - 4. Continued active surveillance of the long term impact of closing the Saint James Olympia Fields Hospital Trauma Center**

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ATTACHMENT #3



“IN A TIME OF CHANGE”

PROGRAM OBJECTIVES

- A. Create a Multi-disciplinary Committee with set objectives, meeting dates/time.
 - 1. Length of meeting limited to 1 ½ hours.
 - 2. Old business must be addressed/discussed by next weekly meeting.
- B. To identify the Emergency Department patient experience in today's current state clinical environment: Meeting National Operational Standards of Care and Beyond
- C. To identify the role differences among Physicians, House staff and RNs: Looking outside the box.
- D. To identify applicable situations for the use of clinical care guidelines: standardize/streamline care.

Emergency Services – Identifying Opportunities for Improvement

- A. Align throughput with typical Emergency Department flow (when busy in the back, go treat in the front.)
 - 1. Implement “Quick Triage” and “Quick Registration” process
 - 2. “Quick Bedding” of patients (Why triage if beds are open?)
 - 3. Initiate Emergency Severity Index (ESI) leveling at Front End
 - 4. Initiate care guidelines early in process
- B. Shorten length of stay (LOS) by increasing efficiency
 - 1. Redefine and standardize roles and responsibilities (Charge Nurse/Senior ED Physician)
 - 2. Maximize use of Cerner tracking board (Improve Communication)
 - 3. Improve turnaround time for Lab and Radiology (Clarify every ordering step/ease communication)
- C. Overall Departmental Throughput
 - 1. Participate in Hospital-wide Patient Throughput initiatives (Improve throughput out of ED)
 - 2. Monitor Key Performance Indicators (KPI) with baseline goals (Improve overall operation)
 - a. Report weekly to ED Chair
 - b. Share at ED meeting with staff
 - c. Present at monthly Medical Executive Committee meetings

PROVIDENT HOSPITAL OF COOK COUNTY

FRONT END Overview of Changes

Quick
Registration

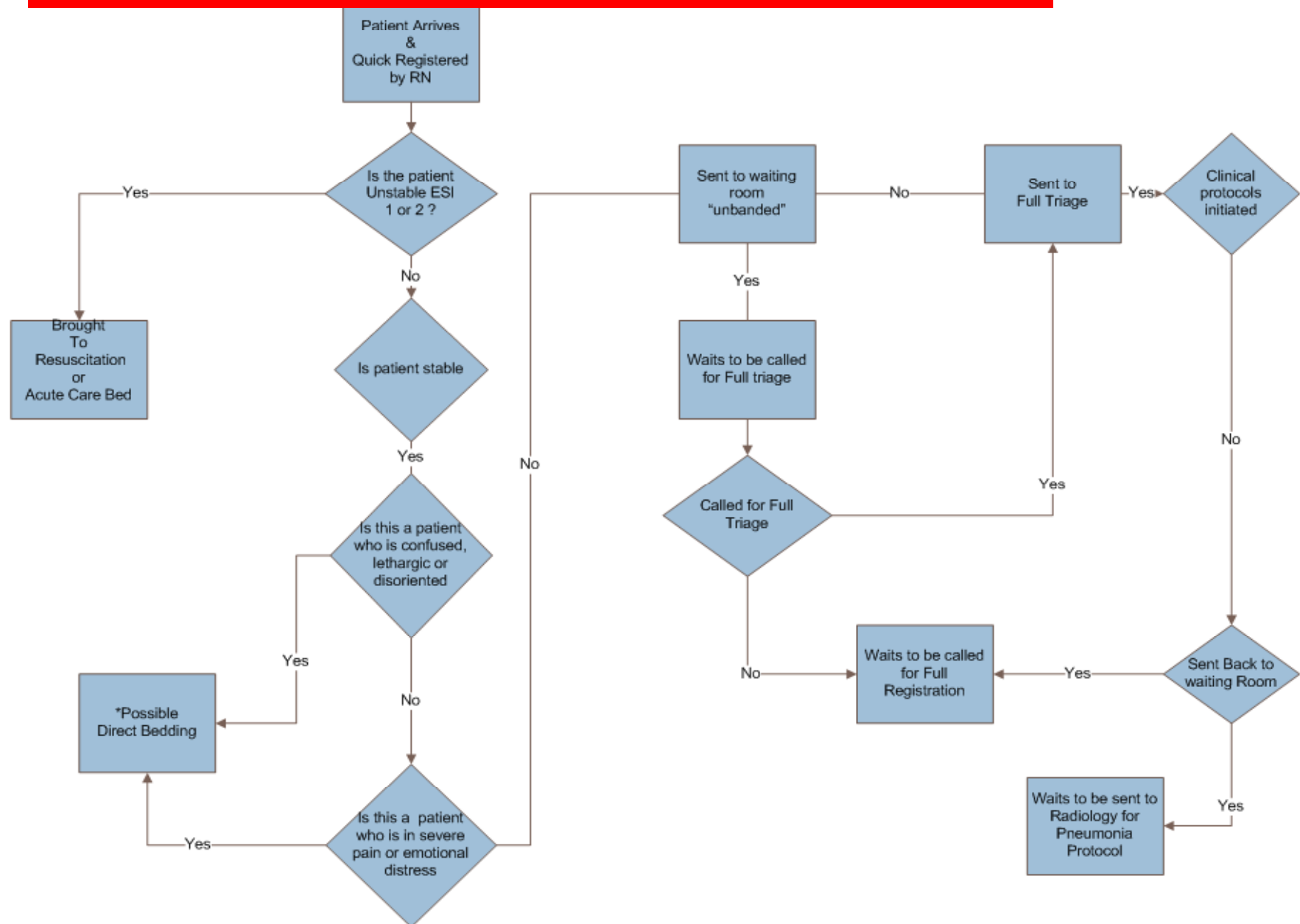
Quick
Bedding

Initiation of
Triage
Guidelines

Roles &
Responsibilities

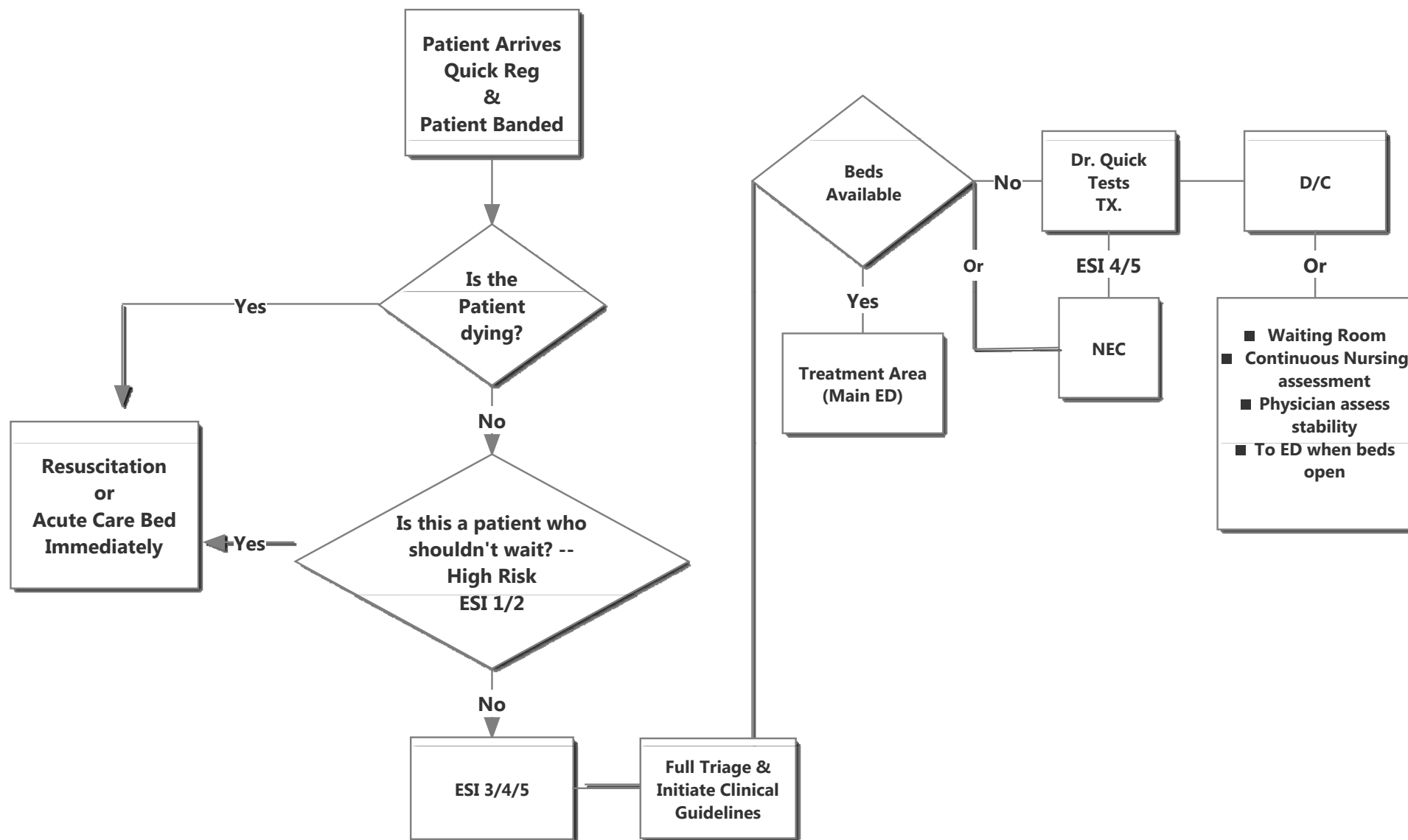
Provident Hospital Emergency Services

Current State Then (January 2011) “Triage Flow”



**Provident Hospital Emergency Services
Present State "Triage Flow"**

Treatment (Dr. Quick) or to Quick Bedding

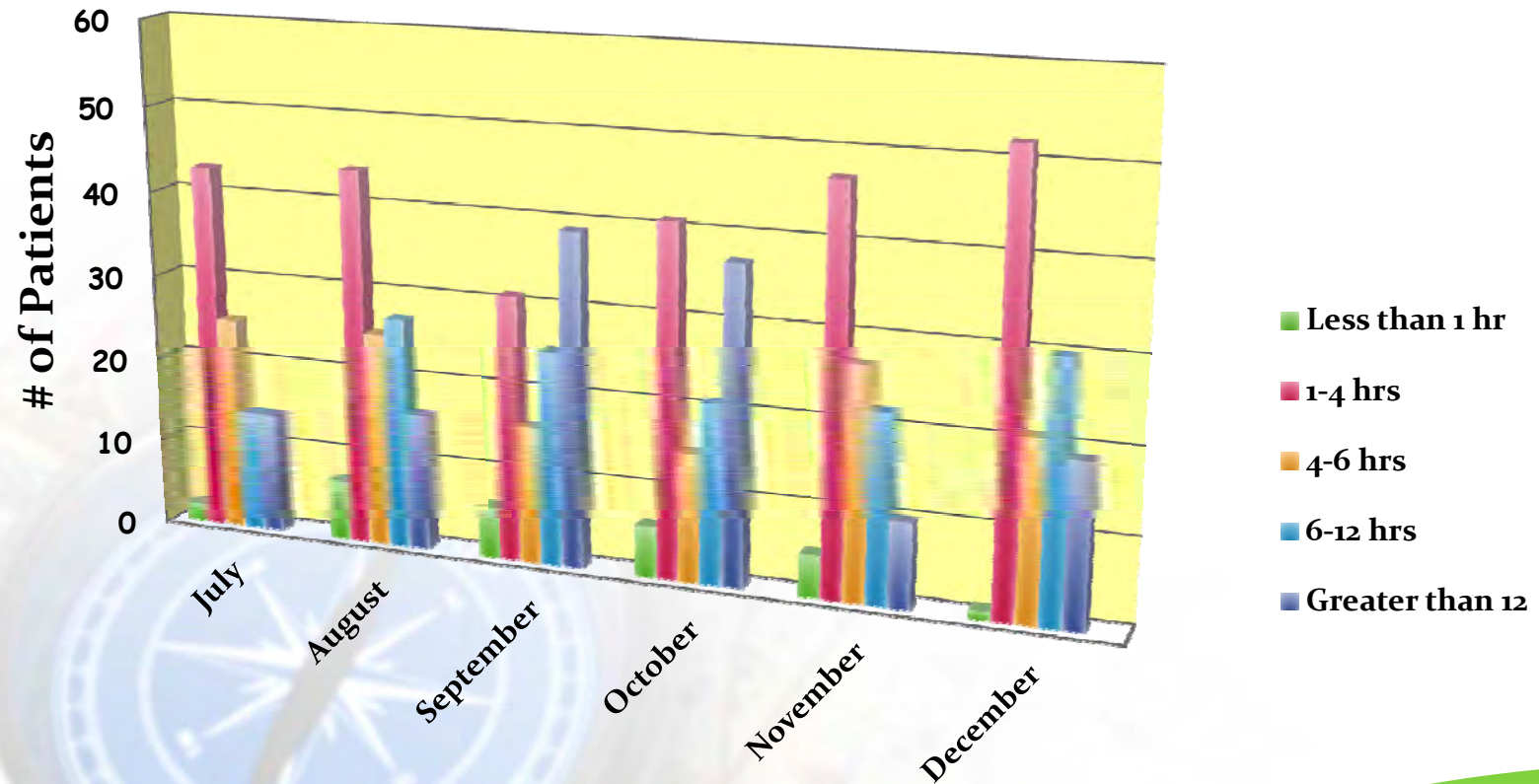


Key Performance Indicators (KPI)

On a regular basis, the Key Performance Indicators (KPI) will be reported and provided to staff to identify areas of improvements and to monitor the results of implemented changes. Below is a Provident ED "Report Card".

Key Performance Indicators
Door to Provider Time (hr:min)**
Average Length of Stay (ED only) (hr:min)
Average Length of Stay -Discharged (hr:min)
Average Length of Stay -Admitted (hr:min)
Lab Turnaround Time - Basic Metabolic Panel (hr:min)
Lab Turnaround Time - CBC with Differential (hr:min)
Lab Turnaround Time - MI Screen (hr:min)
Lab Turnaround Time - CK-CKMB (hr:min)
Lab Turnaround Time - Troponin (hr:min)
Lab Turnaround Time - Urinalysis (hr:min)
Radiology Turnaround Time - Plain Film (hr:min)
Radiology Turnaround Time - CT without contrast (hr:min)
Radiology Turnaround Time - CT with contrast (hr:min)
Percent Left Without Being Seen
Nursing Worked Hours per Patient Visit

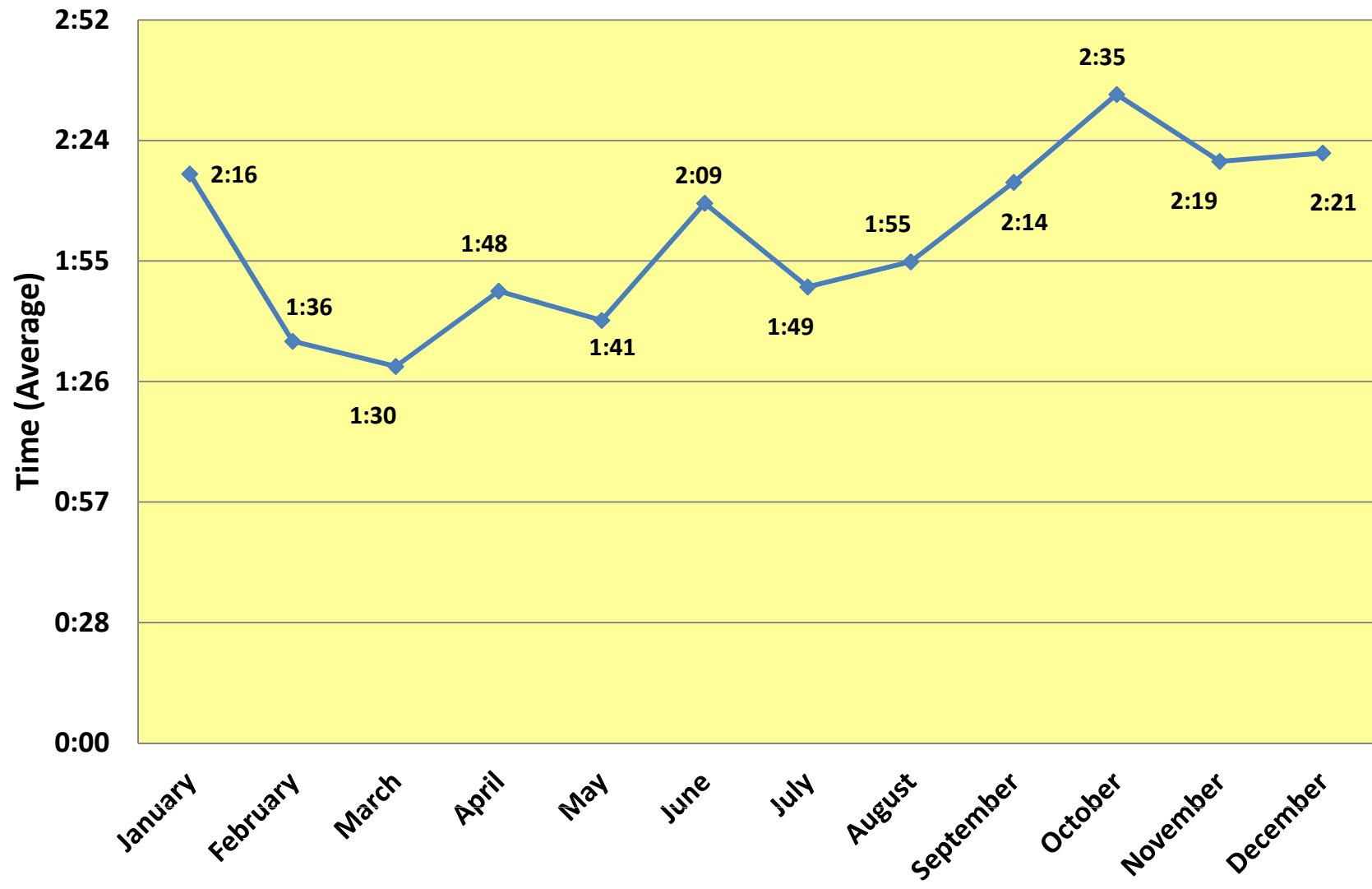
Patients for Admit to Bed at Provident



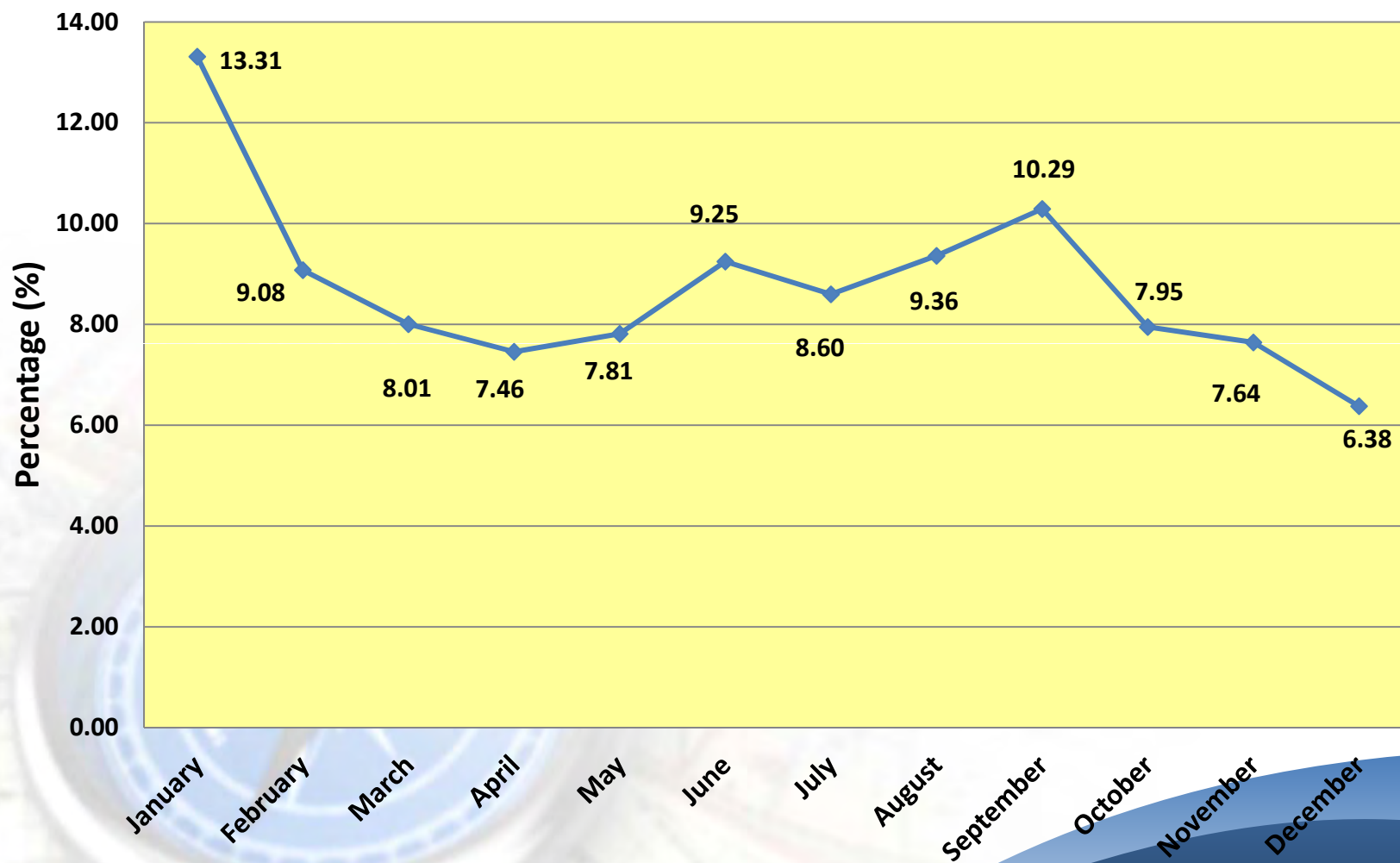
Total Full Admit: 695

ED to Floor Full Admit Wait Time

Quick Reg. to ED Bed Assigned (Fiscal Yr. 2011)



Left Without Treatment (%)



Fiscal Year 2011

Most Recent Accomplishments

Committee to create Virtual Beds in the Emergency Department

- Immediate Hospitalist's attention to all admitted patients holding in ED for a bed = patient safety and improve patient satisfaction.

Low Risk Chest Pain Protocol / Cardiac-Diagnostics

- R/O MI in ED
- Avoid unnecessary admissions

IMMEDIATE GOALS

- Solidifying Dr. Quick Daily
 - Decrease LWOT
 - Patient Safety
 - Improve patient's satisfaction
 - Facilitating ED/NEC Treatments



Success

- ❖ Patient's Satisfaction
- ❖ Avoid unforeseen sentinel events in waiting room/ED
- ❖ KPI measurements/monitoring
- ❖ Core measures

THE END



Cook County Health and Hospitals System
Minutes of the Quality and Patient Safety Committee Meeting
January 17, 2012

ATTACHMENT #4

Access to Trauma Care in Southern Cook County

An Assessment of the Impact of Closing St. James Olympia Fields Trauma Unit

Analysis

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ABSTRACT

Saint James Hospital in Olympia Fields closed its Level I Trauma Center on July 1 2008. This Trauma Center had cared for acutely injured patients in the southern suburban area of Cook County since the inception of the Illinois Trauma System in 1988. The Cook County Department of Public Health (CCDPH) has documented the serious health problems facing southern Cook County, which has been complicated by major demographic shifts, growing poverty and high injury and homicide rates. As the Cook County Health and Hospitals System implements its strategic plan, an important policy question is how to address the trauma needs of southern Cook County. The Cook County Department of Public Health on behalf of the Cook County Health and Hospitals System contracted with the School of Public Health University of Illinois to assess the impact of the closure of trauma services at Saint James Hospital at Olympia Fields on southern Cook County. CCDPH created a Project Management Team to guide the analysis and conclusions and make recommendations. The Project Management Team included faculty from the School of Public Health, staff from CCDPH, and multidisciplinary staff from the Department of Trauma at Stroger Hospital as well as Trauma Directors and surgeons from Advocate Christ Hospital, Loyola University Hospital, and Mt. Sinai Medical Center.

This assessment was done through an analysis of three existing databases. Two of the databases are collected by the Illinois Department of Public Health and they include the Emergency Medical System Pre-Hospital database and the Trauma Registry. The analysis includes all acutely injured patients transported by a licensed ambulance (e.g. fire departments and private), treated in level I or level II trauma centers for more than 12 hours, and/or admitted to a State registered hospital between 2005 and 2009 in the Southern Cook County region affected by the closure of St. James Olympia Fields trauma unit. The analysis does not include outpatients treated and released from hospitals without specialized trauma units.

During the first 12 months following the closure of the Saint James Olympia Fields Hospital Trauma Center, there was no evidence of an increase in in-hospital deaths, an increase in medical complications or the likelihood of a patient being discharged to an intermediate care facility. The length of hospitalization increased modestly by 0.4 days (approximately 10 hours on average) among those injured in the most southern parts of the Saint James Olympia Fields Hospital catchment area. In addition, patients coming from the southern part of the catchment area were more likely to require mechanical ventilation after the closure of the trauma unit (adjusted OR =1.58; CI95%: 1.10, 2.26). This finding persisted even when patients transferred by ambulance between hospitals were excluded from the analysis.

Since the closure of the Saint James Olympia Fields Hospital Trauma Center, the analysis indicates that seriously injured patients that had formerly been treated at Olympia Fields are now being treated at Advocate Christ Hospital or Riverside Hospital in Kankakee. Persons suffering minor injuries, in particular orthopedic injuries, are continuing to be treated at the Saint James Olympia Fields Hospital, although Palos Hospital showed a significant increase in acutely injured patients admitted during the 12 months after July 1, 2008. Furthermore, ambulance services from towns in the most southern zone of the Olympia Fields catchment continue to bring most of the acutely injured patients to Saint James Olympia Fields Hospital regardless of severity of injury. The moderate and seriously injured patients are then transferred to Advocate Christ Hospital.

Although there were no immediate adverse effects, Advocate Christ Hospital has picked up the majority of seriously injured patients that previously would have been treated at Olympia Fields. Advocate Christ Hospital is the only facility with specialized trauma care within the Southern Cook County area. The system is not static, population shifts and changes to factors that are associated with injury -- traffic patterns, poverty, crime, and aging populations -- may result in long term effects missed by this analysis. The Project Management Team has the following recommendations to improve and safeguard the regional trauma system in Southern Cook County (1) create a centralized ambulance service in Southern Cook County, (2) develop pathways to facilitate coordination and planning between hospitals with specialized trauma units independent of trauma region, (3) create a system in Illinois to designate hospitals as level III and IV trauma units, and (4) continue surveillance of the long term impacts of closing Saint James Olympia Fields Hospital Trauma Center.

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EXECUTIVE SUMMARY

Background: Saint James Hospital in Olympia Fields closed its Level I Trauma Center on July 1 2008. This Trauma Center had cared for acutely injured patients in the southern suburban area of Cook County since the inception of the Illinois Trauma System in 1988. The Cook County Department of Public Health (CCDPH) has documented the serious health problems facing southern Cook County, which has been complicated by major demographic shifts, growing poverty and high injury and homicide rates. As the Cook County Health and Hospitals System implements its strategic plan, an important policy question is how to address the trauma needs of southern Cook County. The Cook County Department of Public Health on behalf of the Cook County Health and Hospitals System contracted with the School of Public Health University of Illinois to assess the impact of the closure of trauma services at Saint James Hospital at Olympia Fields on southern Cook County. CCDPH created a Project Management Team to guide the analysis and conclusions and make recommendations. The Project Management Team included faculty from the School of Public Health, staff from CCDPH, and multidisciplinary staff from the Department of Trauma at Stroger Hospital as well as Trauma Directors and surgeons from Advocate Christ Hospital, Loyola University Hospital, and Mt. Sinai Medical Center. The Illinois Trauma System, under the authority of the Illinois Department of Public Health has a total of 65 adult and pediatric trauma centers with 22 hospitals designated as a Level I centers and 43 designated as a Level II.

Importance: Research shows that patients suffering severe traumatic injuries who are undertriaged to facilities without trauma units suffer more adverse health outcomes and are more likely to die than those receiving care in level I or II trauma units. Furthermore, delay in treatment resulting from longer transport times has also been associated with greater in-hospital complications and mortality rates. Disparities in access to trauma care have important public health and social implications, as well as affect the functioning of the hospitals that receive an excess of patients because they cover too extensive an area.

Objectives: The overall goal of this research project was to determine whether the closing of the St. James Olympia Fields Hospital trauma unit resulted in an increase in adverse outcomes in those injured across the affected region.

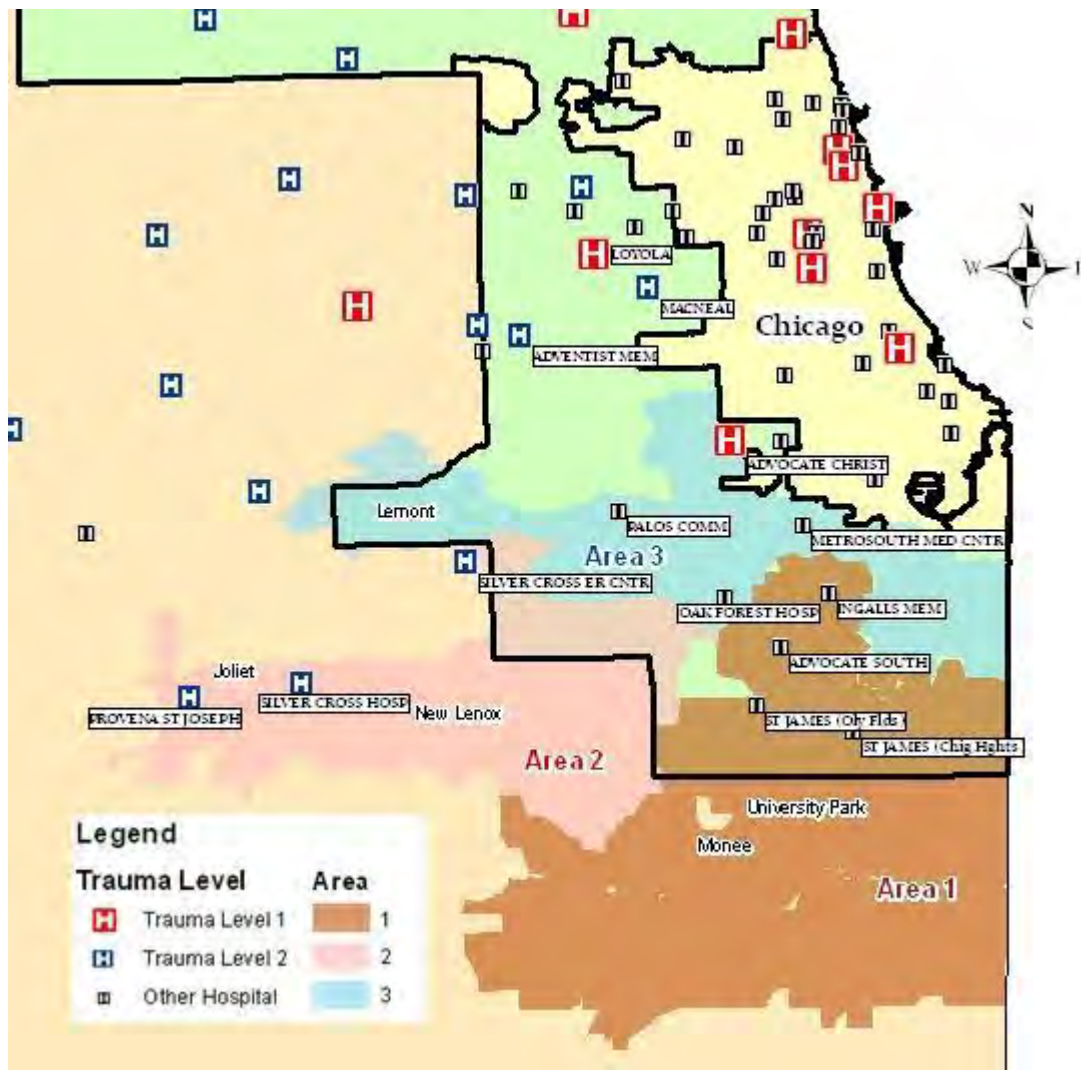
Study Design: This assessment was done through an analysis of three existing databases. Two of the databases are collected by the Illinois Department of Public Health and they include the Emergency Medical System Pre-Hospital database and the Trauma Registry. The Hospital Discharge database originates at the Illinois Hospital Association. We used probabilistic data linkage methods to link two of the three databases -- the Hospital Discharge database and the Trauma Registry -- to help identify trauma patients treated in both specialized trauma units and general emergency rooms. We conducted comprehensive descriptive, spatial, temporal and multivariable analyses of acute traumatic injuries occurring in the affected communities, in order to determine where trauma patients were treated after the closure of the St. James Olympia Fields Hospital trauma unit and whether patients from Olympia Fields the catchment area had more adverse outcomes after the closure. Key personnel were also interviewed to clarify trauma system issues in the affected region, to decide on appropriate outcomes to measure, and to assist in interpreting the results.

Participants: All acutely injured patients transported by a licensed ambulance (e.g. fire departments and private), treated in level I or level II trauma centers for more than 12 hours, and/or admitted to a State registered hospital between 2005 and 2009 in the Southern Cook County region affected by the closure of St. James Olympia Fields trauma unit. The analysis does not include outpatients treated and released from hospitals without specialized trauma units.

Results:

- *Data Linkage:* The final linkage rate between the hospital discharge dataset and the trauma registry was 91.2%. Because key linkage variables were either incomplete or missing in the EMS pre-hospital dataset, we were unable to link to this dataset.
- *Defining Olympia Fields Catchment Area:* A total of 44 ZIP codes defined the principal catchment zone of St. James Olympia Fields Hospital trauma unit, in which 97.5% of all injuries occurred (scene of injury) and 87% of the patients resided. Acutely injured patients from this catchment area were treated in 30 different hospitals. All the hospitals treated at least 25 patients from the Olympia Fields catchment area between 2005- 2009. The catchment zone was divided into three regions based on the distance and mean ambulance run times to both St. James Olympia Fields Hospital and Advocate Christ Hospital. The EMS pre-hospital database was used to ascertain ambulance run times. (Figure 1)
 - Area 1 is the area around St. James Olympia Fields/Chicago Heights and south of the two hospitals, and it takes 5 minutes or longer to travel to Advocate Christ Hospital as compared to Olympia Fields/Chicago Heights.
 - Area 2 is an area between Christ hospital and Olympia Fields/Chicago Heights, and it takes 1 to 3 minutes longer to travel to Christ as compared to Olympia Fields/Chicago Heights.
 - Area 3 is the area nearest Advocate Christ Hospital (just south or west of Christ hospital) and the mean/median run times to either Christ or Olympia Fields/Chicago Heights only differed by +/-1 minute.
- *Flow of Trauma Patients at St. James Olympia Fields Hospital:* St. James Olympia Fields Hospital was treating an average of 126.5 trauma patients per month prior to the closure of their trauma unit. This includes most outpatient cases (hospitalized for 12-23 hours) and all inpatient cases injured across the Chicagoland area (hospitalized for 24 or more hours). After closing its trauma unit, the number of trauma patients treated and admitted at St. James Olympia Fields Hospital for acute traumatic injuries dropped to an average of 41 per month ($p<0.001$). St James Olympia Fields Hospital continues to treat trauma patients, but very few of them suffer from serious injuries (NISS > 16). In fact, only 19 patients with NISS scores of 25 or higher (severe injuries) were treated and admitted during the immediate year following closure of the trauma unit. By comparison, St. James Olympia Fields Hospital treated 453 patients with severe injuries during the 3.5 previous years for an average of 129 severe cases per year. None of the patients admitted for serious injuries (NISS > 16) died during their hospitalization in the year following closure. St. James Olympia Fields Hospital saw large declines in the proportion of patients injured in motor vehicle crashes (20% to 5%) and assaults (10% to 4%) after the closure of their trauma unit. However, St. James Olympia Fields did have an increase in the proportion of elderly patients injured from falls.

St. James Olympia Fields Hospital trauma unit Catchment Area (Figure 1)



*The unincorporated areas inside the St. James Olympia Fields Hospital catchment are cover approximately 7,500 residents.

- Primary Hospitals Treating Trauma Patients from Olympia Fields Catchment Area:** St. James Olympia Fields Hospital staff reported to us that St. James Olympia Fields and Chicago Heights Hospitals are still receiving many acutely injured patients from the southernmost region of Cook County (and parts of Will and Kankakee counties). This is occurring because many of the ambulance services of towns in area 1 are reluctant to transport patients so far north to Advocate Christ, West to Silver Cross, or south to Kankakee Hospital. These long transport times often means an ambulance unit is unavailable for other services for more than two hours. Therefore, many area 1 ambulance services are transporting patients to St James Olympia Fields or Chicago Heights Hospitals to be stabilized, and then these patients are primarily being transferred to Advocate Christ Hospital. Based on the hospital discharge dataset for inpatients, the number of transfers to Christ more than doubled after the closure of the Olympia Fields trauma unit ($p < 0.001$), and the largest increase was from area 1 ($p < 0.001$). Advocate Christ Hospital is receiving most of the seriously injured patients from Olympia Fields catchment area, but some are going to Riverside Hospital. During the first 6 months after the closure of the Olympia Fields trauma unit, some seriously injured cases were admitted to Rush Medical Center in

Chicago. Among minor and moderate injuries, the majority end up at Advocate Christ Hospital, but a small number of minor injuries are going to Palos Hospital. Because the total loss in patients is not equivalent to the gain at Advocate Christ and other hospitals with statistically significant increases in patients from the St. James Olympia Fields Hospital catchment area, it appears that a proportion of patients are being distributed across multiple hospitals, but the increase in these hospitals was not detectable. And many patients are simply continuing to be treated at St. James Olympia Fields Hospital.

- *Adverse outcomes associated with the closure of the St. James Olympia Fields Hospital trauma unit:* There was no evidence of an association between the closure of the St. James Olympia Fields Hospital trauma unit and an increase in in-hospital deaths, increase in medical complications or the likelihood of a patient being discharged to an intermediate care facility. We did find that patients coming from area 1 of the Olympia Fields catchment area were more likely to require mechanical ventilation after the closure of the trauma unit (adjusted OR =1.58; CI95%: 1.10, 2.26). Based on the regression model, the predicted probability that a patient would require mechanical ventilation rose from 5.3% to 8.9% among those coming from area 1. When we looked at length of stay, patients from area 1 and 3 showed a significant increase in their length of hospitalization after the closure of the St. James Olympia Fields trauma unit. However, the average increase was less substantial among patients coming from area 3 (increase of 0.22 days; approximately 5 hours longer stay) than from area 1 (increase of 0.41 days; approximately 10 hours longer stay). All of the regression models controlled for trend, age, gender, length of stay, injury severity (NISS), Charlson Comorbidity Index, trauma complications, penetrating injuries, surgical intervention, penetrating injuries and mechanical ventilation.

Summary of Adverse Effects Following the Closure of the St. James Olympia Fields Trauma Unit

Outcome	Change After Closure	Measure of Change
In-Hospital Deaths	No change observed in any of the 3 areas	NA
Medical complications resulting from traumatic injury	No change observed in any of the 3 areas	NA
Requiring intermediate care after discharge	No change observed in any of the 3 areas	NA
Days of total hospitalization	Small increase among patients in the southern and northern parts of the catchment area.	Southern area - increase of approximately 10 hours Northern area – increase of approximately 5 hours
Required mechanical ventilation	Increase among patients from the southern parts of the catchment area	Mechanical ventilation rose from 5.3% to 8.9%
Total medical charges	Small decline among patients from the southern and central parts of the catchment area	Decline of \$633.84 in the southern area and a decline of \$888.14 in the central area

Our goal was to address the following specific research questions:

1. ***Which hospitals are treating the patients that previously would have been treated by Olympia Fields?*** St. James Olympia Fields is continuing to initially treat many of the traumatically injured in their catchment area. Because most ambulance services from towns in the most southern zone of the Olympia Fields catchment area are reluctant to transport patients so far north to Advocate Christ, West to Silver Cross, or south to Kankakee, they are simply bringing injured patients to St. James. These long transport times often means an ambulance unit is unavailable for other services for more than 2 hours. However, St. James is effectively transferring nearly all of the moderate and seriously injured patients to Advocate Christ Hospital. Persons suffering minor injuries, in particular orthopedic injuries, are being treated at St. James. Patients transported directly to other facilities are primarily ending up at Advocate Christ Hospital, but Riverside Hospital (serious injuries) and Palos Hospital (minor injuries) did show a significant increase of patients coming from the Olympia Fields catchment area. In addition, it appears that a proportion of traumatically injured patients are being treated across a diffuse number of area hospitals.
2. ***Are more patients undertriaged in the affected southern communities now that the trauma unit at Olympia Fields is closed?*** Among those suffering moderate and serious injuries, there is no evidence that the number of patients undertriaged to facilities without specialized care increased after the closure. The regional trauma system appears to have functioned as designed, with Advocate Christ Hospital and Riverside hospitals being the primary treatment facilities for moderately and seriously injured patients from the former Olympia Fields catchment area.
3. ***Have the transport times for patients injured in the southern suburbs increased and by how much?*** Depending on the distance and location of the scene of injury, travel times did change. Travel times from a specific ZIP code to a specific hospital did not change significantly, but there was a shift in the primary destination of patients. Mean and median travel times for patients in areas 1 and 2 of the catchment area are longer for those going to Advocate Christ Hospital than patients sent to Olympia Fields or Chicago Heights.
4. ***Has the closure of the trauma unit been associated with an increase in adverse effects (more deaths, more costly hospitalization, greater disability at discharge)?*** There was no evidence of an increase in in-hospital deaths, medical complications resulting from traumatic injuries, or patients requiring intermediate care after discharge. Patients from the southern and northern sections of the Olympia Fields catchment area showed modest increases in lengths of stay of approximately 5 to 10 hours. We did find that the proportion of patients requiring mechanical ventilation rose from 5.3% to 8.9%, but only among those in the southern parts of the catchment area (furthest from Advocate Christ Hospital).
5. ***Among the hospitals with trauma units most affected by the closing of Olympia Fields – Advocate Christ Hospital -- has there been an increase in adverse effects across all the patients treated in these facilities?*** It is possible that in facilities over burdened by excess patient volume because of the closure of Olympia Fields, trauma teams would be activated for a lower proportion of patients because their resources are over extended. Advocate Christ Hospital did go on bypass more frequently after the closure of the Olympia Fields trauma unit, but the duration of the bypass times decreased. In our analysis of patients treated at Advocate Christ Hospital, more patients required mechanical ventilation (adjusted OR=1.61; CI95%: 1.25, 2.09) and the length of stay was slightly longer after July 1, 2008 (increase of 0.17 days; CI95%: 0.02, 0.32). Among those transferred from the Olympia Fields catchment area to Advocate Christ Hospital, we found no evidence of a negative effect across all of the key outcome measures, except that hospital

charges were higher among persons transferred after the closure of the St. James trauma unit (increase of \$2,284; CI95%: 540, 4028).

6. ***How has Advocate Christ Hospital managed the increased influx of acutely injured patients since the closure of the St. James Olympia Fields trauma unit?*** According to interviews, Christ Hospital has increased staffing by eight trauma surgeons, in part to address an increase in patient volume as a result of the changes in the trauma system. However, the staffing increase was also in response to an expansion of the type of trauma services Advocate Christ Hospital provides.

Conclusions & Recommendations

Although there were no immediate adverse effects, Advocate Christ Hospital has picked up the majority of seriously injured patients that previously would have been treated at Olympia Fields. Advocate Christ Hospital is the only facility with specialized trauma care within the Southern Cook County area. The system is not static, population shifts and changes to factors that are associated with injury -- traffic patterns, poverty, crime, and aging populations -- may result in long term effects missed by this analysis. The Project Management Team has the following recommendations to improve and safeguard the regional trauma system in Southern Cook County

1. **Create a centralized ambulance service in Southern Cook County** - Many of the communities in Southern Cook County have very limited resources to provide adequate pre-hospital care to persons injured within their cities. St. James Olympia Fields Hospital staff has reported to us that many ambulance services continue to bring acutely injured patients to St James Olympia Fields and Chicago Heights Hospitals. This is occurring because many of the ambulance services of towns in the most southern section of Cook County are reluctant to transport patients so far north to Advocate Christ, West to Silver Cross, or south to Kankakee Hospital. These long transport times often means an ambulance unit is unavailable for other services for more than 2 hours. Therefore, many ambulance services are transporting patients to St James Olympia Fields or Chicago Heights Hospitals to be stabilized, and then these patients are primarily being transferred to Advocate Christ Hospital. A centralized ambulance service would ensure that resources are equitably and efficiently distributed among the Southern Cook County communities. A centralized system could be (1) owned and managed by the county, (2) a co-op funded by cities on the southside, or (3) a hybrid system that creates a centralized management group to oversee a private/public ambulance system.

2. **Develop pathways to facilitate coordination and planning between hospitals with specialized trauma units independent of trauma region** - Currently, Advocate Christ Hospital is the primary facility treating persons suffering serious injuries in Southern Cook County. Ongoing population shifts may increase the frequency in which Advocate Christ Hospital is unable to treat all injured patients seeking treatment at their facility. Coordination and planning between facilities with existing specialized trauma units, independent of trauma region, may help reduce or prevent disruptions in trauma care.

3. **Create a system in Illinois to designate hospitals as level III and IV trauma units** - Approximately half of all acutely injured persons in Illinois are treated at hospitals without specialized trauma care. Many hospitals are currently acting as de facto level III trauma facilities (i.e. a facility used to stabilize patients before transfer to a higher level trauma unit). Most hospitals coordinate and communicate with other hospitals within and outside their EMS region, regardless of whether they have specialized trauma teams. A hospital does not have to be part of an EMS region to be able to access the regional trauma committee. However, creating a

support structure to facilitate and enhance the integration of hospitals without specialized trauma units into regional trauma systems would (1) improve inter-hospital coordination by facilitating communication between hospitals (2) bring more active partners to the table, (3) and identify trauma training needs for the Level III or IV facilities. Additionally, by certifying hospitals as level III/IV facilities, policy makers will be able to inform local constituencies about trauma resources that are generally unrecognized within their communities (i.e. nearby community hospitals that provide trauma care). Expansion of the existing trauma system and providing adequate training requires an increase of financial and administrative support by the State to both hospitals with specialized trauma units and hospitals caring for trauma patients without a recognized/certified trauma team. Without cost sharing arrangements and administrative support from IDPH, any move to expand the current trauma system will likely be resisted by many hospitals.

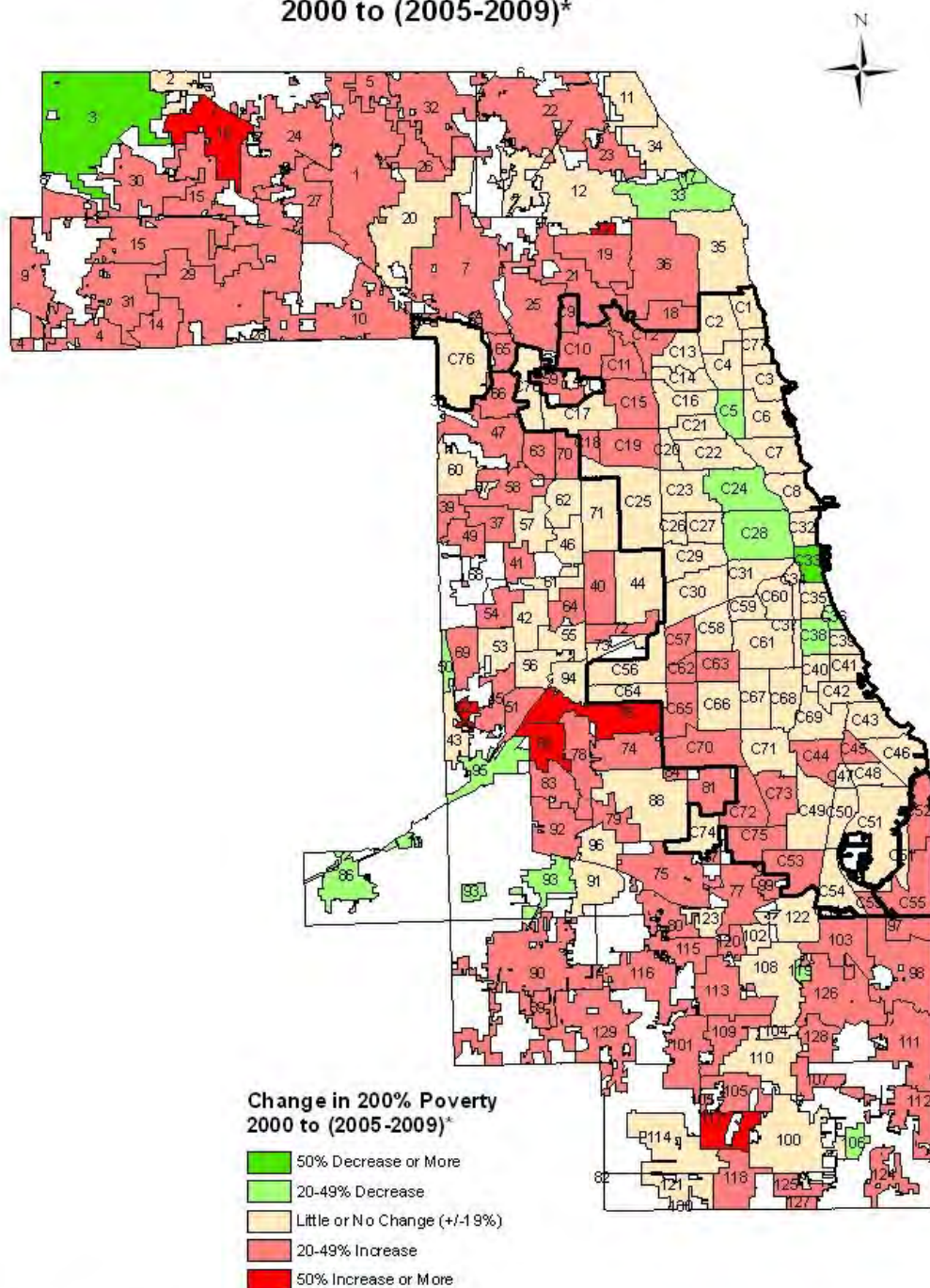
4. Continued active surveillance of the long term impact of closing the Saint James Olympia Fields Hospital Trauma Center - The current analysis is restricted to the evaluation of the immediate impact of closing the St. James Olympia Fields Hospital trauma unit. However, the system is not static, population shifts and changes to factors that are associated with injury -- traffic patterns, poverty, crime, aging populations -- may result in long term effects missed by this analysis. As part of an ongoing surveillance program, an annual report should be generated on this issue using the data sources made available for this analysis. Developing an annual forum to share and discuss the annual report with trauma directors within Cook County and the surrounding region would be an important element of the proposed ongoing surveillance program. This will enable trauma directors to improve coordination and planning. As part of developing an ongoing injury surveillance program in Cook County, it is important to work closely with the State and other important partners to ensure that the data required for the surveillance program is easily accessible. The Emergency Medical System Pre-Hospital database, the Illinois Trauma Registry and the Hospital Discharge database are critical to examining factors that inform and provide evidence for decision making on issue of trauma care. One major barrier is that the Chicago Fire Department stopped reporting to the state Emergency Medical System Pre-Hospital database in 2006. Because of the importance of the data, the Chicago Fire Department should be compelled to report to the State all of its EMS prehospital run data. Furthermore, EMS reporting should be carefully evaluated statewide to improve completion of data fields so that the Emergency Medical System Pre-Hospital database can be better utilized for system evaluations such as this report.

BACKGROUND

The WePlan of the Cook County Department of Public Health has documented the serious health problems facing southern Cook County, which has been complicated by major demographic shifts, growing poverty and high injury and homicide rates. A number of socioeconomic changes impact the health policy planning for the residents of Cook County. Although there was only a 0.7% increase in the population in the Cook County Department of Public Health's jurisdiction between 2000 and 2010, there was a large shift in the racial/ethnic makeup in the CCDPH region. In the areas covered by CCDPH, the white Hispanic population increased 44% from 302,000 to 437,000 people, the African American population increased 20% from 310,000 to 371,000 people, and the Asian population increased 30% from 115,000 to 150,000. Furthermore, the proportion of older adults living in Cook County is increasing – an increase of 12% of older adults between the ages of 45-64. A substantial number of communities in suburban Cook County have also noted an increase in the number of residents facing extreme poverty (more than 200% below the poverty line). The population in poverty increased by 34% in CCDPH's jurisdiction (excluding unincorporated areas; see Map below). The percentage of people living at or below the 100% federal poverty level increased from 6.4% in 2000 to 8.5% for 2005-2009 estimates, while 13.6% of residents living in the Southern District lived in poverty in 2009. Furthermore, the near poor population increased by 23% in suburban Cook County from 2000 to 2009 with the majority of this increased noted in the southern region of the County. Over this same period the City of Chicago noted a decrease in the near poor population. Demographic changes across the county will require health policy planners to tailor resources, communications and outreach to meet the changes needs of the residents in Cook County.

Access to care continues to be an issue for this area, with increase over the past decade of the medically underserved populations (MUP: see Map below). In 2009, 11% of adults in Southern Cook County reported having no healthcare coverage. In addition 13.2% did not have a primary care provider, and correspondingly 16% of Southern Cook County residents reported that they did not go to a physician for a routine check-up during the two years prior to the survey.

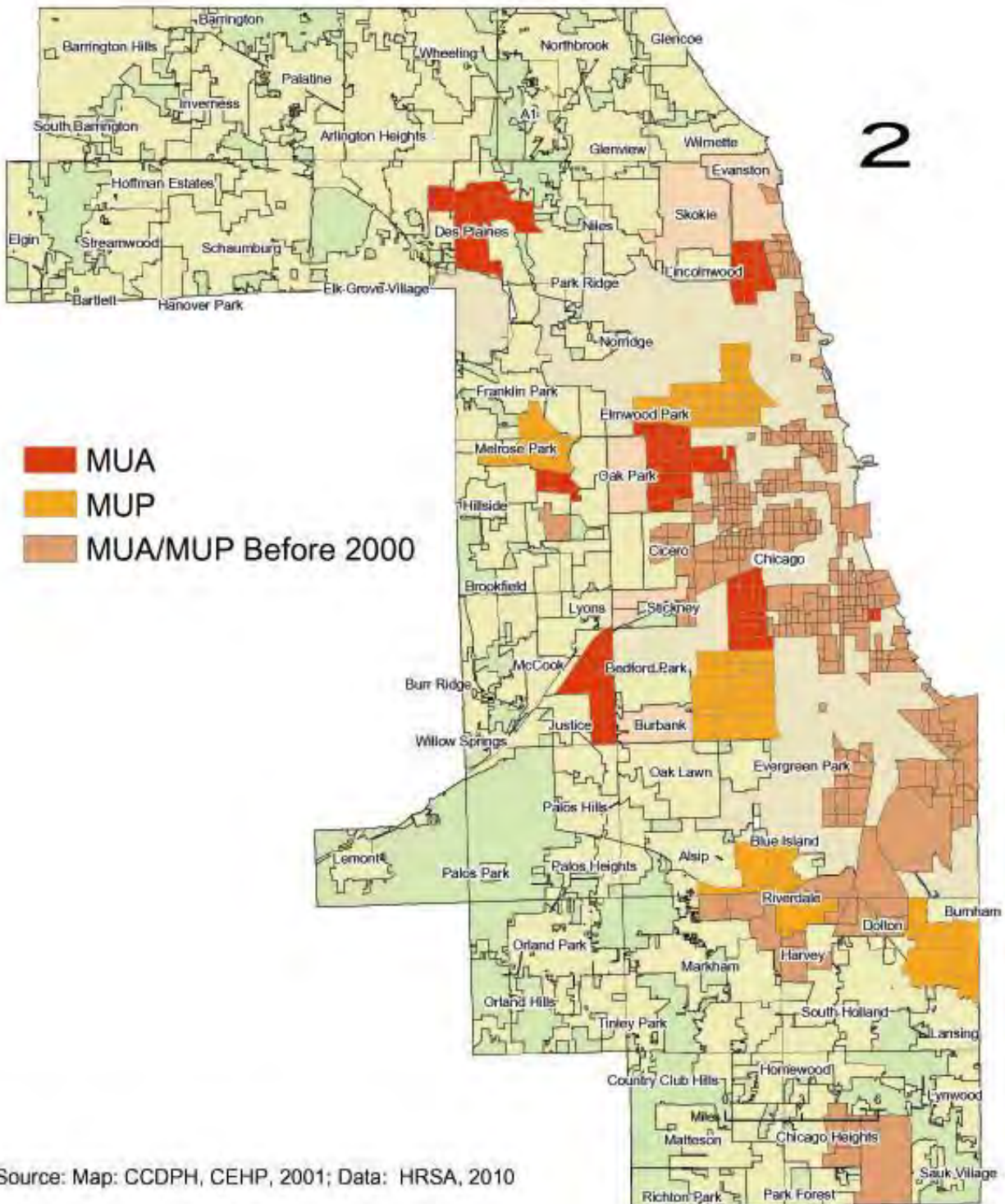
Cook County **Change in 200% Poverty** **2000 to (2005-2009)***



Cook County Department of Public Health, Epidemiology Program Office

*Data Source: 2000 U.S. Census, 2005-2009 American Community Survey (2010 poverty rates not available for geographical areas with less than 20,000 population)

MUA/MUP Designated Areas in Chicago and Suburban Cook County Illinois Since January 1, 2000



Source: Map: CCDPH, CEHP, 2001; Data: HRSA, 2010

Southern Cook County incorporates a number of townships which face significant health problems relating to acute injury. The main causes of injury are motor vehicle crashes, falls and intentional violence. The rising population and increasing traffic volume will correspond to growing number of people injured from car crashes in the southern region. The aging population inevitably is associated with a increasing number of fall related injuries. Furthermore, the areas surrounding St James Hospital have the highest youth homicide and firearm mortality with 148 intentional firearm deaths in 2007 occurring in Southern Cook County. Between 2005-2007 in the southern district, homicide was the leading cause of death for young males (ages 15-24yrs), and nearly 50% the intentional firearm deaths occur in African American males.

As the Cook County Health and Hospitals System implements its strategic plan, an important policy question is how to address the trauma needs of southern Cook County. Impacting this policy issue was the closure of the Level 1 Trauma Center at Saint James Hospital in Olympia Fields on July 1, 2008. This Trauma Center had cared for severely injured patients in the southern suburban area of Cook County since the inception of the Illinois Trauma System in 1988. The Illinois Trauma System under the authority of the Illinois Department of Public Health currently recognizes a total of 65 adult and pediatric trauma centers with 22 hospitals designated as a Level I centers and 43 designated as a Level II. These numbers includes centers from neighboring states (Indiana, Iowa and Missouri.)

The closing of Saint James as a trauma center reflects a national trend of accelerated closures since 2001 with a loss nationally of 339 centers from 1990 to 2005. The loss of these centers have disproportionately affected communities with high numbers of African Americans; moderate to high share of uninsured residents; poor communities and people within rural areas. (Hsia) These trends have occurred despite wide spread evidence of the effectiveness of trauma care and that delay in treatment resulting from longer transport times has also been associated with greater in-hospital complications and mortality rates. Factors which have been attributed to the closure of trauma centers are the high cost of trauma care, underfunding of the system and number of trauma patients that lack a source of payment.

The Cook County Department of Public Health on behalf of the Cook County Health and Hospitals System contracted with the School of Public Health University of Illinois to assess the impact of the closure of trauma services at Saint James Hospital at Olympia Fields on southern Cook County. CCDPH created a Project Management Team to guide the analysis and conclusions and make recommendations. The Project Management Team included faculty from the School of Public Health, staff from CCDPH, and multidisciplinary staff from the Department of Trauma at Stroger Hospital as well as Trauma Directors and

surgeons from Advocate Christ Hospital, Loyola University Hospital, and Mt. Sinai Medical Center. The overall goal of this research project is to determine whether the closing of the St. James Olympia Fields trauma unit has resulted in an increase in adverse outcomes in those injured since the closing across the affected region. Where analyzing each IDPH dataset individually would only provide us a snapshot of each phase of treatment, the data linkage of three trauma related datasets will allow us to evaluate the impact of closing the St. James Olympia Fields trauma unit across the continuum of care, from pre-hospital through hospital discharge. We will address the following specific research questions:

1. ***Which hospitals are treating the patients that formally would have been treated by Olympia Fields?*** We will use spatial and temporal analyses to identify the flow of patients to hospitals – with and without trauma units – which have picked up the care of injured patients in southern Cook County following the closure of the Olympia Fields trauma unit. We will assess the magnitude of the change in patient volume in these hospitals, controlling for baseline trend.
2. ***Are more patients undertriaged in the affected southern communities now that the trauma unit at Olympia Fields is closed?*** We will use an interrupted time series analysis to analyze the trend of traumatically injured patients treated in hospitals without trauma units across the affected region of southern Cook County.
3. ***Have the transport times for patients injured in the southern suburbs increased and by how much?*** We will use a variety of time-series and multivariable models to assess the impact on transport times. The simplest models will compare mean transport times before and after the closure of Olympia Fields. These analyses will also help assess the level of bypass occurring system-wide, which will increase transport times.
4. ***Has the increase in transport time and undertriage – if it has occurred -- been associated with an increase in adverse effects (more deaths, more costly hospitalization, greater disability at discharge)?*** Multivariable models will be developed to look at the impact of higher transport times on a variety of health outcomes, but with emphasis on length of hospitalization, duration of stay in an intensive care/critical care unit, duration of assisted ventilation, medical complications, and short-term mortality (in-field and in-hospital case fatality rates).

5. *Among the hospitals with trauma units most affected by the closing of Olympia Fields (e.g. Christ), has there been an increase in undertriage within the hospital (i.e. lower rates of trauma team activation) and adverse effects across all the patients treated in these facilities?*

The trauma registry collects information on trauma team activation. It is possible that in facilities over burdened by excess patient volume because of the closure of Olympia Fields, may activate their trauma teams for a lower proportion of patients because their resources have been over extended.

METHODS

Data Collection

We have a data sharing agreement with the Illinois Department of Public Health to obtain the Illinois trauma registry (ITR) and EMS Pre-Hospital Run Data (EMS). Data for the Hospital Discharge (HD) dataset was obtained through the University of Illinois Business Planning and Decision Support Division. We received data for years 2005 - 2009 for all three datasets. We have IRB approval from UIC as well as IDPH. In addition, data on bypass dates for years 2007 to 2011 were provided by the Division of Emergency Medical Services and Highway Safety at the Illinois Department of Public Health. Table 1, below, shows the data elements in each of the three databases that were used for this investigation.

Emergency Medical Services Pre-Hospital Run Data

The EMS pre-hospital run data includes ambulance run reports for every emergency pre-hospital transport, interhospital transport or refusal of care incident for every vehicle service provider in Illinois. However, beginning in 2006 the Chicago Fire Department EMS service stopped reporting their run data to IDPH. The Chicago Fire Department pre-hospital run database is managed by the City of Chicago. The EMS database includes the following variables: total call time (time to definitive care; time the call was received until the time of arrival at the hospital), mode of transport (ambulance, helicopter), emergency level of transport (Non-Emergent, Downgraded-No Lights/Sirens, Upgraded-L/S, Emergent-L/S), type of extrication used, factors that delayed in EMS access or detection (e.g. adverse road conditions, adverse weather, crowd control, hazardous materials, language barrier, prolonged extrication, unsafe scene, vehicle problems), protective equipment in car and passenger location in vehicle for motor vehicle crashes, patient status information (body part injured, pupil dilation, pulse, blood pressure, Glasgow coma score, skin temperature, respiratory rate, lung sounds, loss of consciousness, shock, cardiac arrest, drugs or alcohol, allergies, symptoms, and medical history), patient treatment variables (e.g. route and type of intravenous, route of medication, cardiopulmonary resuscitation, EKG findings, airway insertion, assisted ventilation, defibrillation, wound management, medications, cricothyroidotomy, spinal immobilization).

Illinois Trauma Registry

The Illinois Trauma Registry (ITR) was mandated by the State legislature and is managed by the Illinois Department of Public Health. All of the State's level 1 and 2 trauma centers (N=62) are required to report

all patients (1) sustaining traumatic injuries (ICD-9-CM external injury codes E800-995) and admitted to a trauma center for > 12 hours, (2) transferred to a level I or II center or (3) are dead-on-arrival (DOA) or die in the emergency department. Level III and IV centers are not included in the ITR. Level III and IV trauma centers primarily provide advanced life support prior to transfer to a level I or II center, or serve communities with no access to level I and II centers. We provide an assessment of data quality in the ITR in a previous paper of ours (Friedman, 2007). The ITR contains data on demographics (age, gender, race/ethnicity), exposure (mechanism of injury), and health outcomes (diagnoses, measures of injury severity, hospital procedures, disability status on discharge), and economics (payer source).

Hospital Discharge Database

The University of Illinois at Chicago Hospital is a member of the Illinois Hospital Association, the organization that compiles and manages the hospital discharge database. As a member of the Illinois Hospital Association, the PI's research team has ongoing access to the hospital discharge database. The hospital discharge database is based on billing records. It includes all patients treated for more than 23 hours in any Illinois hospital (i.e. inpatients only) for any medical reason. The hospital discharge database includes variables on patient demographics (age, gender), exposure (mechanism of injury), health outcomes (diagnoses, hospital procedures, discharge status), and economics (hospital charges, payer source).

Data Cleaning

We merged individual year files to create a single data file for each of the three State datasets for the five years of interest (2005-2009). For the first step of data cleaning, we identified duplicates within each database by matching cases (rows) on the following variables - name, date of birth, hospital, residential ZIP code, place of injury, gender, ethnicity, injury date, hospital admission date, external cause of injury. Duplicates were identified and coded as duplicates, but were not removed until after the data linkage. Records of duplicate entries were aggregated instead of deleted to avoid losing important data that may only be available in one of the two (or more) duplicate entries. We used a series of SAS macros that identified and removed duplicate cases (Friedman, 2007).

Table 1: Description of Three State Datasets Used for Data Linkage Project: EMS Pre-Hospital Run Data, Illinois Trauma Registry, Hospital Discharge Database

Database	Data Elements				
	Inclusion Criteria	Demographics	Exposure Data	Health Data	Economic Variables
Trauma Registry (ITR)	Persons treated in level 1 or 2 trauma unit for ≥ 12 hours (~45,000/yr)	Name Gender Age-DOB Race/ethnicity	ICD9 E-codes E849, showing location where injury occurred Time, day, date of injury	ICD9 N & E-codes Body site Severity Hospital procedures Treatment Disability status on discharge Blood alcohol	Cost of hospitalization Hospital procedures Hospital days
Hospital Discharge (HD)	All individuals hospitalized in Illinois	Gender Age-DOB Race/ethnicity	ICD-9 N and E codes	ICD 9 codes Hospital procedures Hospital cost Discharge status	Cost of hospitalization Hospital days Payer source
EMS Pre-Hospital Run Data	All patients transported by a licensed ambulance (e.g. fire departments and private)	Gender Age Race/ethnicity Date of birth Home Zip code Hospital	Cause of injury Location of injury County of incident Use of protective equipment Response time Transport mode Delays in treatment	Injury description Body part/s affected Prehospital vitals (Glasgow, BP, pulse) Preexisting conditions Allergies Medications Treatment information	None
*ICD 9 External Injury Code E 849 has decimal points that give the place injury occurred, e.g., E849.1 is Farm					

We reviewed every data field to look for non-sense entries. We corrected non-sense entries caused by blatant data entry errors. For example, a year of injury of 2202 among other cases where the year is 2002 was changed to 2002. We also identified values outside the permitted parameters (e.g., age = 200 years), and corrected them, when possible. Next, we selected specific data elements to review for accuracy. For example, dates of injury should be the same, or one day prior to, date of admission (in cases that they are not related to “late effects”).

We used the North American Association of Central Cancer Registries’ (NAACCR) quality control criteria to assess the data completeness of the different databases (Table 2). The criteria include missing

data for key variables, timeliness of reporting, and unresolved duplicates (Hofferkamp, 2008). In a previous assessment of the ITR, we found the data to meet NAACCR's highest level of data quality (Friedman, 2007). Both the hospital discharge and trauma registry datasets met the highest quality criteria set by NAACCR, but the EMS did not because of missing residential ZIP information. However, the EMS data did have a very high completeness for the county in which the incident occurred (3.5% missing).

Table 2: Data Completeness for Variables Used in Data Linkage

	Pre-Hospital Runs (EMS)	Hospital Discharge (HD)	Trauma Registry (ITR)
Main Linkage Variables			
Date of Birth	96.7%	100%	99.6%
Date of Admission/Treatment	100.0%	100%	100%
Gender	99.5%	100%	100%
Receiving Hospital Code	94.9%	100%	100%
Date of Discharge	na	100%	100%
Secondary Linkage Variables			
Residence ZIP Code	89.7%	100%	99.4%
County of Injury	95.4%	na	95.2%
Race/Ethnicity	75.4%	na	98.2%
Cause of Injury (E-Code)	na	100%	99.4%
Type of Injury (N-Code)	na	100%	96.1%

Data Linkage

Our goal was to link individual cases across the three databases in order to establish a single merged dataset of acute traumatic injuries occurring in the southern towns of Cook County. Because not all trauma patients are treated in a level 1 or 2 trauma unit, many acutely injured patients appear in the hospital discharge dataset which captures all inpatients. Both datasets miss outpatients who are treated and released within 12 hours for the trauma registry or within 23 hours for the hospital discharge dataset. The linked dataset will capture most patients treated for more than 12-23 hours for a traumatic injury by a trauma unit in Southern Cook County, and nearly all inpatients. Because the EMS dataset was missing resident location information and had an incompatible coding system for describing injury type and body region affected, it was not feasible to link the EMS ambulance run data with the trauma registry and hospital discharge datasets. *The data linkage was restricted to the ITR and HD datasets only.*

We used probabilistic linkage methodology to link the two datasets. The data linkage methodology entails the linkage of individual case (patient) records across two or more databases, allowing the formation of a new dataset that includes all the variables collected in each database. There are two main methods for linking data: “deterministic” and “probabilistic.” Deterministic linkage involves the exact, one-to-one character matching of pre-designated variables across two or more datasets; this technique is frequently used when identifiers, such as name and social security number, are available. Although deterministic linkage methods intuitively provide greater confidence that records from two different databases describe one case, the idea of deterministic linkage, in practice, is far more complicated. For example, misspelled names or errors in data entry would prevent matching of cases that describe the same person. Probabilistic linkage can solve this problem, and is used when identifiers are not available. Probabilistic linkage requires the researcher to make assumptions regarding the probability that records from two different databases match, and allows for a decision as to which records should be included in the combined data file and attributed to a single case that is recorded in two different systems. This technique allows greater flexibility and offers the ability to match a larger number of cases. The probabilistic linkage process generates probabilities of a match based on the number of variables that exactly match and the variables that are close, but not exact, matches.

First, we standardized the format of all of the matching variables across the datasets, ensuring that the variable types, lengths, and codes were equivalent. A combination of SQL and SAS code was written to carry out all steps in the linkage, using SAS Version 9.1 (See Appendix 1). We used the following variables for the data linkage: receiving hospital, date of birth, gender, residential ZIP code, date of admission/treatment, date of discharge and ICD-9 N-codes describing the injury. Table 2 outlines the completeness of the key variables used in the data linkage for each dataset.

We ran multiple passes in the linkage process, which allowed for variations in the data caused by data entry errors. Table 3 presents the variations in matching criteria by each subsequent linkage pass. The concept of using multiple passes is to begin with the highest level of precision and then modify the precision with each subsequent step, thereby, ensuring that higher probability matches are identified in the initial step, and removed from the datasets prior to subsequent steps, so that they don’t match again to another case when the matching criteria is less rigorous. In the subsequent passes we used “fuzzy” matching criteria to allow for data entry errors, intentional omissions or differences in coding procedures. The initial pass identified matches between the datasets that matched exactly on all matching variables (74.4% of matches). In the second pass, we omitted ZIP code to account for data entry errors or intentional omission or misrepresentation by the patient (5.9% of matches). In the third pass, we a

allowed dates of admission to vary by +/- 1 day (13.4% of matches). This was important, because some hospitals' billing departments systematically begin the date of admission at the time a patient becomes an inpatient, which is 24 hours after the patient arrives at the hospital for treatment. However, the trauma registry uses the date and time the patient arrives to begin treatment, regardless of patient status (outpatient vs. inpatient). In the subsequent passes, different fuzzy matching criteria were used (passes 4 through 9: 6.4% of all matches).

The final linkage rate between the TR and HD was 91.2%. There are several reasons the linkage rate was not 100%. First, the two datasets capture slightly different populations. The trauma registry includes outpatients (patients held for observation for less than 23 hours), receives data from out of state hospitals, and has many cases transferred between facilities (ranges from 2.5% to 5.0% of patients each year). In contrast, the hospital discharge database only includes inpatients (LOS > 23 hours) and is based on billing records. The second reason for some cases not linking is "split billing" in the HD dataset, which generally is used when separate bills are issued for treatment by different specialists during a single hospitalization (e.g. neurologist, endocrinologist, trauma surgeon). The patients will have multiple records for the same period of time, but the diagnoses may differ substantially based on the treating physician's specialty. In the hospital discharge dataset, we also identified cases in some hospitals where patients have multiple records with identical diagnoses, but different and consecutive admission and discharge dates. These occurred primarily among patients with long lengths of stay. In contrast, the trauma registry does not appear to have incidents of split billing. Third, in some hospitals, the date of admission and/or date of discharge systematically differed by one day from the dates listed in the trauma registry. When screening for matches, the patients' data were identical on all variables except for date of admission and/or date of discharge. This likely rises from a difference in the definition of the time of admission to the hospital. The HD dataset is based on billing systems for inpatients. Some systems differentiate between outpatient and inpatient status, therefore, the first 24 hours (outpatient status) are billed separately from any subsequent days of hospitalization (inpatient status). In these cases, the date of admission in the inpatient dataset will systematically be one day after the initiation of treatment. The TR is a medical record system with a focus on treatment protocols and quality of care, rather than billing, therefore the day the treatment is initiated is considered the date of admission. Finally, data entry errors are another possible explanation for non-matches. Both datasets would be affected by data entry errors.

Table 3: Data Linkage Steps

	Hospital Number	DOB	Gender	ZIP Code	Date of Admission	Date of Discharge	Type of Injury	% of Matches
TR to HD Linkage								
1st pass	Exact	Exact	Exact	Exact	Exact	Exact	Match	74.4%
2nd pass	Exact	Exact	Exact	Omit	Exact	Exact	Match	5.9%
3rd pass	Exact	Exact	Exact	Exact	+/- 1	Exact	Match	13.4%
4th pass	Exact	Exact	Exact	Exact	Exact	+/- 1	Match	0.6%
5th pass	Exact	Exact	Exact	Omit	+/- 1	Exact	Match	0.1%
6th pass	Exact	Exact	Exact	Omit	+/- 1	+/- 1	Match	1.2%
7th pass	Exact	Year	Exact	Exact	Exact	Exact	Match	1.8%
8th pass ^a	Exact	Exact	Exact	Exact	+/- 3	+/- 3	Match	1.0%
9th pass ^b	Exact	Exact	Exact	Omit	+/- 1	+/- 1	No Match	1.6%

^aPass eight accounts for split billing. Some hospitals use split billing to charge for specialists and at some hospitals there was systematic split billing used to split up the hospital stay of a patients into several continuous hospitalizations.

^bPass nine allows for variations in billing emphasis. The HD dataset is based on billing records. Hospitals have specialists that are involved in coding patient diagnoses to maximized billing. Any given patients, may have several billing codes for a certain specific diagnosis or injury. The code used varies by the experience of the treating medical staff or the coding determined by the billing nurse.

Probability of Mismatches

We expected the data linkage process to be very efficient because the data completeness was very high on the key matching variables. Because we have the receiving hospital name/code in each dataset, the linkage was done within hospital strata. Overall, each hospital with and without trauma units in Southern Cook County receives an average of three new acutely injured patients per day (maximum of 29 in one day). At St. James Olympia Fields Hospital prior to the closure of its trauma unit, the facility averaged 4.2 new patients per day, and the St. James Chicago Heights facility averages 1.8 new patients per day. At Christ, there was an average of 8.3 new patients per day. The smaller frame for linking records improves the efficiency and accuracy of the process.

We used the trauma registry to estimate the real mismatch probability using the linkage variables. The TR includes patient name, which allows us an additional level of information for confirming matches. We identified duplicates using a subset of the variables used in the data linkage. Identifying duplicates within datasets or between datasets involves similar procedures. Across all the patients in the trauma registry between 2000 and 2009 (N=452,491), we identified 2,467 duplicate records (some were triplicates) when using receiving hospital, date of birth, gender, date of admission, and date of discharge (we omitted ZIP code to mirror later passes in the linkage process). Then we manually screened these

duplicates to identify true mismatches using patient name, ICD-9 diagnosis codes, and cause of injury codes. Of the duplicates, 2,447 (99.2%) were double entries for the same patients within the same hospital. This means that 0.5% of all trauma records are duplicate entries. This can result from system errors (e.g. a record is submitted twice after data entry), errors between coders (e.g. two or more coders accidentally enter a patient's information twice), or from quality control practices at facilities that intentionally have two coders enter the same patient information. Of the remaining duplicates, 10 records were clear mismatches and 10 had different variations of the patient name, but identical medical information on diagnosis and cause of injury codes. Based on this real world exercise, the probability of mismatches using the five main linkage variables (receiving hospital, date of birth, gender, date of admission, and date of discharge) is very low (0.002% or 2 per 100,000 records).

Case Definition

This analysis only includes patients suffering acute traumatic injuries identified by ICD-9-CM codes 800-956. We exclude patients suffering exclusively from poisoning, late effects, contusions, abrasions, and superficial injuries.

Defining St. James Olympia Fields Catchment Area

The analysis focused primarily on Southern Cook County, with some patients from Will, Kankakee and DuPage counties. Based on both scene of injury and patient residence, the main catchment area of focus in Cook County covered Orland Park in the Northwest corner to Calumet City in the Northeast corner to Sauk Village in the Southeast corner to University Park in the Southwest corner. Only patient records from the trauma registry had ZIP codes for the scene of injury. Therefore, for patients without ZIP codes for the scene of injury, we used the residential ZIP codes instead. Among the 45,979 patient records that had both a scene and residential ZIP codes, 67% of the patients suffered injuries in the same ZIP code they resided. **Overall, the mean approximate distance between the a patient's home and scene of injury was 3.4 miles, with 90% of the patients injured within 10 miles of their place of residence.**

To identify the catchment area, the ZIP code for scene of injury and patient residence was analyzed for both St. James Olympia Fields and St. James Chicago Heights. **We identified 44 different ZIP codes in which 97.5% of all injuries occurred (scene of injury).** Only those with trauma registry information had data on scene of injury. In addition, 87% of the patients lived within 44 ZIP codes. The remainder lived in other parts of Illinois and Indiana, or had undisclosed residence locations.

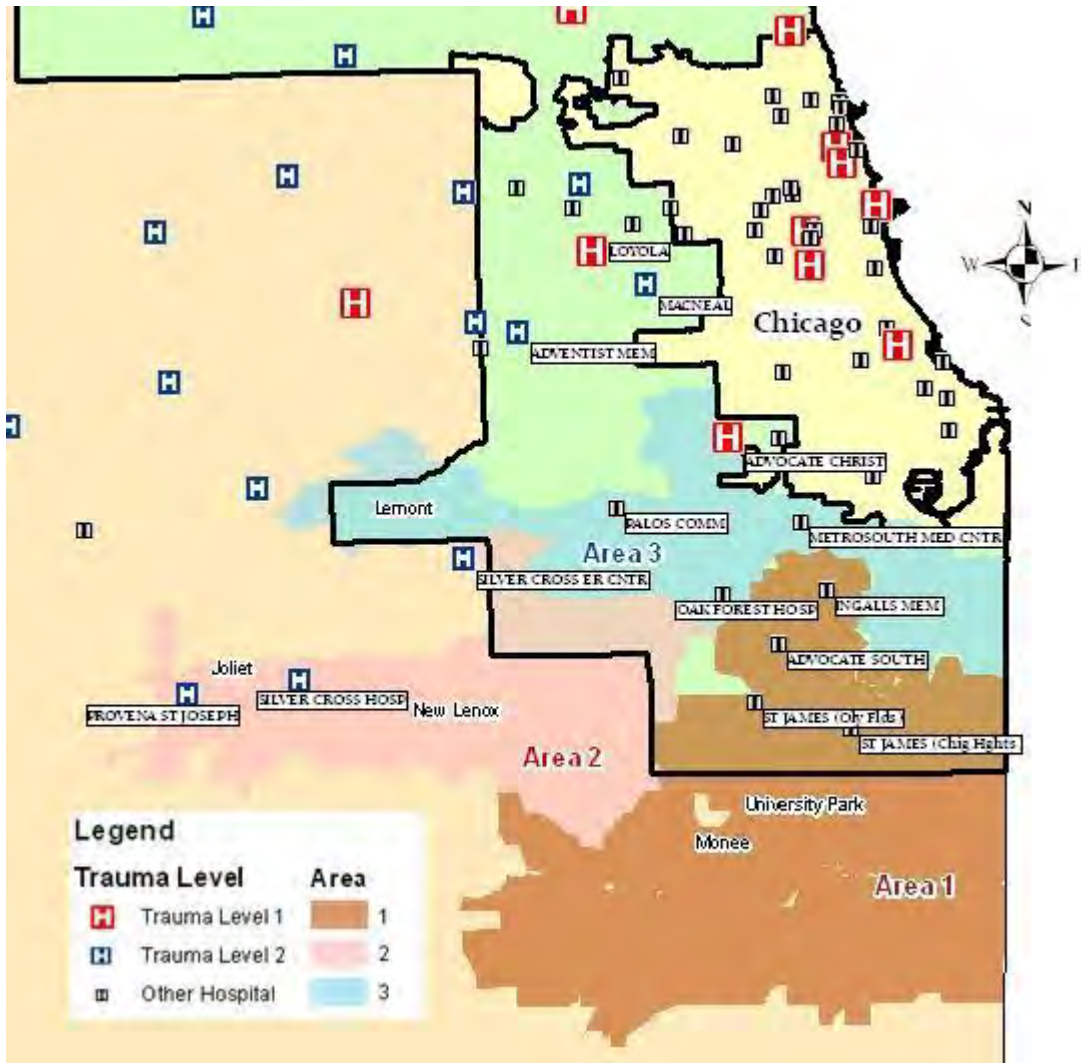
This catchment area of 44 ZIP codes was divided into three regions based on distance and mean ambulance run times (See Map 1). We used the EMS pre-hospital run data, to determine the median and mean run times for patients from the 44 ZIP codes to both St. James Olympia Fields and Advocate Christ Hospital. (Map 1)

- Area 1 is the area around Olympia Fields/Chicago Heights and south of the two hospitals, and it takes 5 minutes or longer to travel to Advocate Christ hospital as compared to Olympia Fields/Chicago Heights Hospitals.
- Area 2 is an area between Christ hospital and Olympia Fields/Chicago Heights Hospitals, and it takes 1 to 3 minutes longer to travel to Christ as compared to Olympia Fields/Chicago Heights Hospitals.
- Area 3 is the area nearest Christ (just south or west of Christ hospital) and the mean/median run times to either Christ or Olympia Fields/Chicago Heights Hospitals only differed by +/-1 minutes.
- These three areas are based on ambulance run times and reflect distinct geographic regions affected by distance from each hospital, proximity and access to highways or major thoroughfares, as well as level of urban development (i.e. congestion of roadways). Based on the ZIP code of the scene of injury, 70% of the patients treated at Olympia Fields trauma center were injured in area 1, approximately 20% in area 2 and 10% in area 3. The ZIP codes for the three areas are listed below in Table 4.

Table 4: Three Areas by ZIP Codes Within St. James Olympia Fields Catchment Area

<u>Area 1</u>	<u>Area 2</u>	<u>Area 3</u>
60426	60432	60439
60428	60433	60464
60429	60435	60462
60430	60436	60463
60425	60451	60803
60478	60467	60452
60422	60487	60445
60461	60477	60472
60443	60448	60406
60471	60423	60459
60411		60827
60475		60419
60466		60409
60401		60473
60468		60438
60417		60476
60915		
60449		

Map1: St. James Olympia Fields Hospital trauma unit Catchment Area



Hospitals Included in the Study

To identify the hospitals to include in the analysis, all hospitals that had 25 or more trauma patients injured in or living in the three areas of the Olympia Fields catchment area between 2005 and 2009 were included. We included 30 hospitals. Table 5 below shows the number of patients identified in each hospital that were injured in or living in the three areas of the Olympia Fields catchment area.

Table 5: List of Hospitals Included in the Analysis and Number of Acutely Injured Patients from Olympia Fields Catchment Area, 2005-2009

Hospital	Area 1	Area 2	Area 3	Percent of All Trauma Patients from 3 Areas
St James Chicago Heights	2728	119	154	90.7%
Advocate South Suburban	1131	287	493	90.1%
St James Olympia Fields	3467	877	696	86.9%
Ingalls Hospital	1341	165	1194	82.2%
Palos Community Hospital	93	1211	2578	70.8%
Silver Cross Hospital	48	3929	354	70.4%
Metrosouth Medical Center	127	70	869	62.1%
Oak Forest Hospital	82	7	88	49.7%
Provena Saint Joseph	24	3422	51	49.1%
Advocate Christ Hospital	677	450	2893	26.5%
Provena St Marys Hospital	326	15	12	14.2%
Riverside Medical Center	525	38	18	13.2%
University Of Chicago	355	84	285	10.5%
Rush University	110	97	195	10.1%
Loyola University	250	490	363	9.5%
University Of Illinois	61	39	70	8.1%
Advocate Trinity Hospital	28	3	65	7.0%
Childrens Memorial Hospit	59	74	66	6.2%
Advocate Good Samaritan	33	144	334	6.1%
Loretto Hospital	10	1	18	5.5%
Northwestern Memorial	181	112	180	5.2%
Adventist Hinsdale	8	37	82	4.1%
John H Stroger Jr. Hospital	267	56	324	3.9%
Adventist Lagrange	9	12	63	3.0%
Macneal Memorial Hospital	21	19	78	2.5%
Mount Sinai Hospital	70	25	108	1.9%
Edward Hospital	8	53	31	1.9%
Louis A Weiss Memorial Hospital	14	9	5	1.6%
Advocate Illinois Masonic	45	16	37	1.4%
Advocate Lutheran General	18	18	20	0.6%

Data Analysis

Descriptive Analysis

We used SAS software for all statistical analyses (v.9.2; Cary, NC). We describe type of injuries and disparities between groups in terms of injury severity, external cause and location of injury (E-Codes), duration of hospitalization, treatment in an intensive care/critical care unit, required mechanical ventilation, medical complications, number of surgeries (orthopedic, non-orthopedic and emergency surgeries), discharge status, and short-term mortality (in-field and in-hospital case fatality rates).

Appropriate parametric (Pearson's chi-square) and non-parametric tests (Wilcoxon Rank Sum) were used to evaluate bivariate relationships. Student's t-test was used to compare mean differences in continuous metrics such as ISS scores and length of hospitalization. The Levenne test was used to test for equal variance between samples to determine whether to use equivariant or non-equivariant statistical measures of significance.

ICD-9 N codes were used to assess body region and type of injury based on the Barell classification matrix (Barell, 2002; Baker, 1974). We used the two primary measures of severity: (1) injury severity scores (ISS) and (2) the New Injury Severity Score (NISS). We also included the Charlson Comorbidity Index (Charlson, 1987) and complications associated with increased mortality in trauma patients. The trauma complications included in the analysis were general complications with ICD-9-CM codes of 958 to 959, poisoning during the course of medical treatment, acute posthemorrhagic anemia, cerebral edema/anoxia/encephalopathy, hypotensive shock, pulmonary insufficiency as a result of trauma, acute respiratory failure, and septicemia. Each patient in the trauma registry has up to 25 ICD-9 diagnosis codes listed in their record and these were used to calculate the Charlson Comorbidity Index and evaluate trauma complications.

We also calculated the in-hospital case fatality rate. The CFR is the number of reported deaths divided by the total number of patients. CFR provides us a proxy measure of severity of injuries and quality of care. The CFR does not include patients dead on arrival.

Multivariable analyses

Each research question required a different analytic approach because of the distribution of the dependent variables, and the relationship between the dependent and independent variables varied. To evaluate changes in trends we used segmented regression analysis. We controlled for trend, autocorrelation, and injury severity in these models.

To evaluate adverse health outcomes associated with the closure of the trauma unit on July 1, 2008, we focused on the following outcomes of injury: in-hospital deaths, medical complications, need for mechanical ventilation, discharge to an intermediate care facility, length of hospitalization, total hospital charges (in U.S. Dollars). We also looked at the role comorbidities played as effect modifiers individually and combined using the Charlson Comorbidity Index (CCI). A two-sided p-value < 0.05 was used to determine statistical significance. For the dichotomous dependent variables (in-hospital deaths, medical complications, need for mechanical ventilation, discharge to an intermediate care facility) we used multivariable logistic regression models. The continuous dependent variables were not normally distributed so we used multivariable robust regression models to assess the relationship with the trauma unit closure. In scenarios with extreme or many outliers causing the data to be skewed, ordinary least squares (OLS) regression will produce biased parameter estimates. For the multivariable regression analysis, we used robust M-estimation as implemented in SAS Version 9 (PROC ROBUSTREG; SAS Institute, Inc., Cary, NC) using bisquare weights. The parameter estimates derived from robust regression are less influenced by outliers. This is generally achieved by weighting observations whose residuals are large.

The multivariable models controlled for the following covariates trend, age, gender, length of stay, injury severity (NISS), Charlson Comorbidity Index, trauma complications, penetrating injuries, surgical intervention, penetrating injuries and mechanical ventilation.

RESULTS

How many trauma patients were treated at St. James Olympia Fields before and after the closure of the trauma unit?

St James Olympia Fields Hospital was treating an average of 126.5 trauma patients per month prior to the closure of their trauma unit. This includes all outpatient and inpatient cases treated from across the Chicagoland area. After closing its trauma unit, the number of trauma patients admitted at St James Olympia Fields Hospital for acute traumatic injuries dropped to an average of 41 per month ($p < 0.001$). Data on outpatients (those treated for more than 12 hours) was no longer available after the trauma unit closed, but outpatients comprised 27% of all St James Olympia Fields Hospital trauma patients (across all the hospitals 8.4% of patients were outpatient). Prior to the closure, 29.1% of the trauma patients treated at St James Olympia Fields Hospital involved serious injuries (NISS > 16 ; average of 36.8 per month), which declined to 7.5% of all trauma patients after July 1, 2008 (average of 3.1 per month). Prior to the closure, 38.6% of the patients at St James Olympia Fields Hospital were minor injuries (NISS < 4) and 32.3% were moderate injuries (NISS 5 -15). (Figure 1; Table 6)

In a segmented regression model controlling for trend and injury severity, the decline in average monthly patients treated at Olympia Fields was most precipitous among the seriously injured patients (NISS 16 and up) showing a decline in mean monthly patients of 42.4 in the period following the closure ($p < 0.001$). In the moderately injured category (NISS 5 to 15), there was a average decline in the mean monthly trauma patients treated at Olympia Fields of 22.2 patients ($p < 0.001$). Among those suffering minor injuries (NISS < 4), there was a decline of 23.9 patients ($p < 0.001$).

Figure 1: Trend of Trauma Patients Treated at St. James Olympia Fields January 2005 to May 2009 by Injury Severity Category

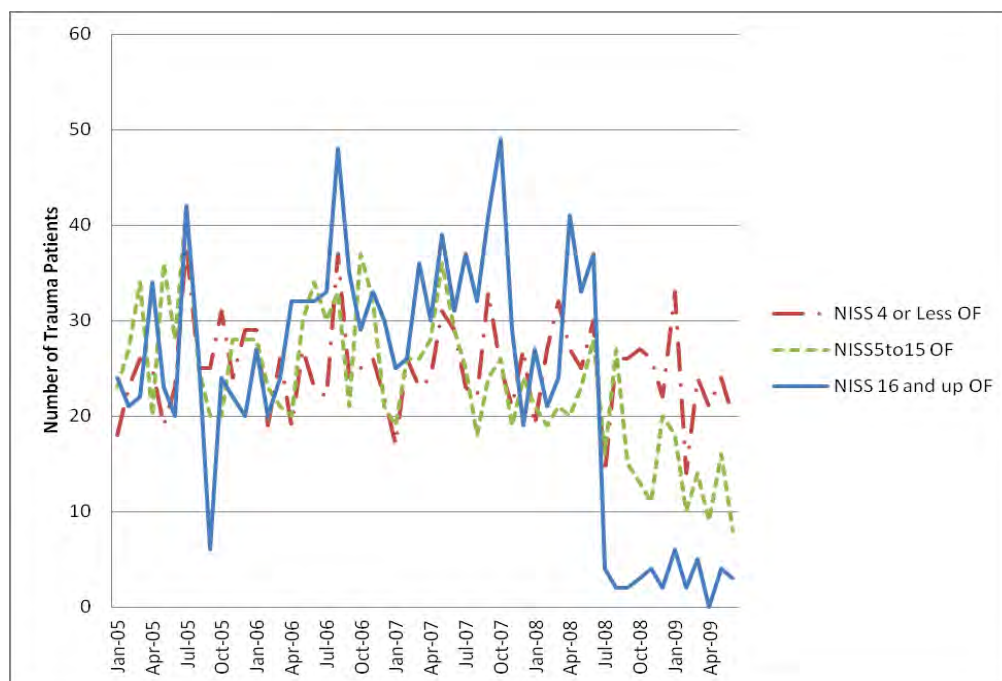


Table 6: Change in the average number of patients treated for traumatic injuries per month before and after the closure of the St. James Olympia Fields trauma unit

	All Trauma Patients Treated*		Outpatient & Inpatient Olympia Fields Catchment Area		Inpatient Only Olympia Fields Catchment Area	
	Prior to July 1, 2008	After July 1, 2008	Prior to July 1, 2008	After July 1, 2008	Prior to July 1, 2008	After July 1, 2008
St. James Olympia Fields						
NISS 4 or Less	48.8	23.1	43.9	20.8	22.6	20.8
NISS 5 to 15	40.9	14.8	36.5	13.5	23.2	13.5
NISS 16 and up	36.8	3.1	29.0	2.9	22.8	2.9
St. James Chicago Heights						
NISS 4 or Less	30.9	27.3	28.2	24.0	28.2	24.0
NISS 5 to 15	26.8	19.8	24.4	18.1	24.4	18.1
NISS 16 and up	6.2	5.2	5.5	4.8	5.5	4.8
Advocate Christ Hospital						
NISS 4 or Less	85.2	92.3	23.1	25.8	20.0	23.8
NISS 5 to 15	90.2	91.8	21.8	25.6	19.0	24.3
NISS 16 and up	83.7	81.3	20.4	23.8	18.3	21.4

*Includes patients from within and outside the catchment area

**"Outpatients" are those treated and discharged within 12 to 23 hours of arriving to the hospital

Who are continuing to be treated at St. James Olympia Fields Hospital?

St. James Olympia Fields Hospital, following closure as Level 1 Trauma Center, continued to treat trauma patients, but very few of them suffer from serious injuries (NISS > 16). In fact, only 19 patients with NISS scores of 25 or higher (severe injuries) were treated during the immediate year following closure. By comparison, St. James Olympia Fields Hospital treated 453 patients with NISS 25+ during the 3.5 previous years for an average of 129 severe cases per year. St. James Olympia Fields Hospital staff treated 37 people with NISS scores between 16 and 24 (serious injuries) treated during the immediate year following closure, down from several hundred per year. None of the patients admitted for serious injuries (NISS > 16) died during their hospitalization in the immediate year following closure. Only 3 of the patients admitted with moderate injuries died (NISS 5 to 15; out of 177; CFR=1.7%).

St. James Olympia Fields Hospital saw large declines in the proportion of patients injured in motor vehicle crashes (20% to 5%) and assaults (10% to 4%) after the closure of their trauma unit. However, St. James Olympia Fields did have an increase in the proportion of elderly patients injured from falls, from 50% to 70% of all trauma patients.

When looking at type of injury, nearly all of the trauma patients at St. James Olympia Fields Hospital were treated for fractures, internal injuries or open wounds. All three injury types showed large drops in the proportion of patients with serious forms of these injuries (NISS > 16) after the closure of the trauma unit (Table 7). After closure of its trauma unit, St. James Olympia Fields Hospital continued to treat primarily minor and moderate fractures involving the upper and lower extremity, with an increase in the proportion of patients treated for hip and pelvic injuries (elderly injured from falls). St. James Olympia Fields Hospital did continue to treat some fractures of the vertebral column, but they were all minor injuries.

There continued to be some patients with moderate and severe internal injuries (N=48; all body parts) treated and admitted to St. James Olympia Fields Hospital during the year after closing its trauma unit, but this number is down from an annual average of 372 patients. Although St. James Olympia Fields Hospital admitted 54 patients with internal injuries of the torso, only five of these patients had severe injuries. After closing its trauma unit, St. James Olympia Fields Hospital only admitted five severe injuries involving fractures of the torso, and 11 cases with severe open wounds or fractures of the head and face. St. James Olympia Fields Hospital did admit 23 patients with severe internal traumatic brain injuries. St. James Olympia Fields Hospital after closure of its trauma unit did not admit any patients for

moderate or severe burns, crush injuries, and amputations. There were also substantial reductions to near zero cases of spinal cord injuries, serious chest injuries, abdominal injuries, and face and eye injuries.

How are patients treated at St James Olympia Fields Hospital entering the hospital?

After the closure of the St. James Olympia Fields Hospital trauma unit, 78.8% of admitted trauma patients came to the emergency department as walk-ins or by ambulance; 14.9% (N=73) were transferred to St. James Olympia Fields Hospital from an intermediate care facility. Nearly all the cases coming into St. James Olympia Fields Hospital after the closure of the trauma unit were emergency cases, and only 6.1% were elective admissions. Only 11 of the admitted trauma patients following the closure of its trauma unit were transferred to another acute care hospital after they were admitted to the hospital.

Table 7: Barrel Matrix - Change in the Distribution of Injuries Before and After the Closure of the Trauma Unit at St. James Olympia Fields, 2005-2009

	Fracture	Internal Injury	Open Wound
Before Trauma Closure			
Traumatic Brain Injury (1-3)	380 (7.2%)	933 (17.6%)	0 (0.0%)
Other Head / Face	525 (9.9%)	0 (0.0%)	1358 (25.6%)
Spinal Column	59 (1.1%)	28 (0.5%)	0 (0.0%)
Vertebral Column	539 (10.1%)	0 (0.0%)	0 (0.0%)
Torso	794 (14.9%)	921 (17.3%)	337 (6.3%)
Upper Extremities	743 (14.0%)	0 (0.0%)	506 (9.5%)
Lower Extremities	1119 (21.1%)	0 (0.0%)	405 (7.6%)
After Trauma Closure			
Traumatic Brain Injury (1-3)	10 (2.0%)	45 (9.2%)	0 (0.0%)
Other Head / Face	40 (8.1%)	0 (0.0%)	67 (13.6%)
Spinal Column	0 (0.0%)	1 (0.2%)	0 (0.0%)
Vertebral Column	26 (5.3%)	0 (0.0%)	0 (0.0%)
Torso	41 (8.4%)	54 (11.0%)	1 (0.2%)
Upper Extremities	58 (11.8%)	0 (0.0%)	19 (3.9%)
Lower Extremities	130 (26.5%)	0 (0.0%)	13 (2.6%)

Who is being transferred from St. James Olympia Fields Hospital after the closure and where are they going?

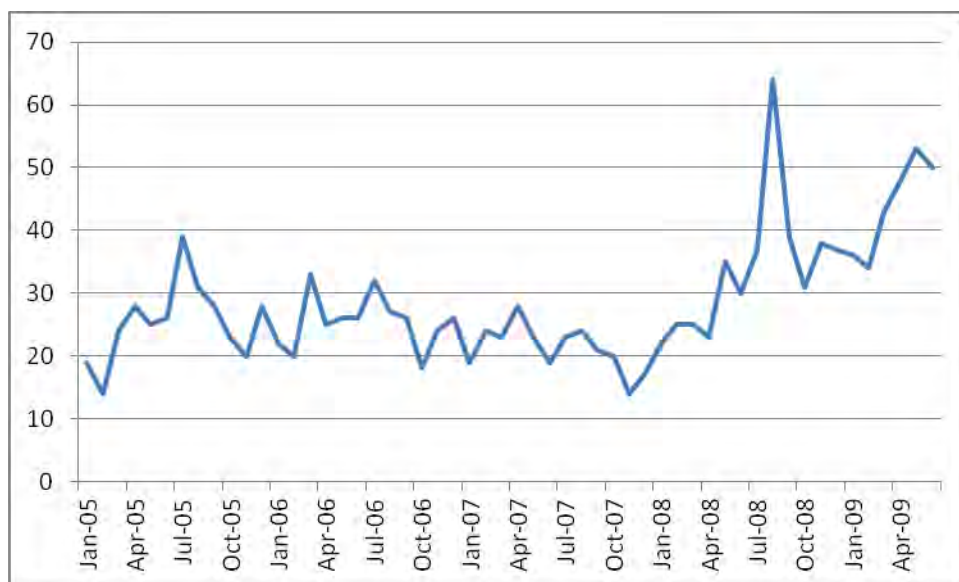
St. James Olympia Fields Hospital staff have reported to us that many ambulance services continue to bring acutely injured patients to St James Olympia Fields and Chicago Heights Hospitals. This is

occurring because many of the ambulance services of towns in area 1 are reluctant to transport patients so far north to Advocate Christ, West to Silver Cross, or south to Kankakee. These long transport times often means an ambulance unit is unavailable for other services for more than 2 hours. Therefore, many area 1 ambulance services are transporting patients to St James Olympia Fields or Chicago Heights Hospitals to be stabilized, and then these patients are primarily being transferred to Advocate Christ Hospital. Based on the hospital discharge dataset for inpatients, the number of transfers to Advocate Christ Hospital more than doubled after the closure of Olympia Fields trauma ($p<0.001$) and the largest increase was from area 1 ($p<0.001$) (Figure 2).

Where are the trauma patients injured in St. James Olympia Fields Hospital catchment area going?

Because of a failure to report trauma cases in 2008 by many of the trauma centers, the data analysis of the flow of patients after the closure of the Olympia Fields trauma unit was limited to inpatients (length of stay > 1 day) reported by the hospital discharge dataset. This removes the outpatients that were not reported in the trauma registry by Advocate Christ Hospital for the latter half of 2008. The patients admitted at Christ's trauma unit as inpatients are included. Based on this data series alone, there was a significant decline of 25.6 seriously injured trauma patients (NISS > 16; $p<0.001$) and a drop of 7.3 moderately injured trauma patients (NISS 5 to 15; $p=0.005$) at St. James Olympia Fields. The drop in minor injuries was not significant (-2.1; $p>0.05$), but this is not surprising since the majority of minor injuries are managed as outpatients and this data series includes only inpatients.

Figure 2: Total Transfers to Advocate Christ Hospital, 2005 to 2009



After closing the Olympia Fields trauma unit, an increase of 18-22 severely injured patients per month were admitted to Advocate Christ ($p=0.014$), and 1 to 3 per month at Riverside Hospital. During the initial 6 months after the Olympia Fields trauma unit closure, severely injured patients were also treated at Rush (2 per month; $p=0.001$), but after the initial period Advocate Christ Hospital became the predominate hospital treating the severely injured within the Olympia Fields catchment area. Among the moderately injured (NISS 5 -15), there was a significant increase of 8.2 patients per month ($p=0.008$) at Advocate Christ Hospital, indicating that all of the moderately injured are being treated at Christ Hospital. Among the minor injuries (NISS <4), nearly all the cases that are hospitalized are remaining at Olympia Fields, but there were significant increases observed at Christ Hospital (increase of 6.6 cases; $p=0.01$) and Palos Hospital (3.1/month; $p=0.05$).

Because the total loss in patients is not equivalent to the gain at Advocate Christ and other hospitals with statistically significant increases in patients from the St. James Olympia Fields Hospital catchment area, it appears that some patients are being distributed across multiple hospitals, but the increase in these hospitals is not detectable. And many patients are simply continuing to be treated at St. James Olympia Fields Hospital.

Has Advocate Christ gone on bypass more frequently since the closure of St. James Olympia Fields Hospital?

From July 2008 through July 2011, Olympia Fields went on bypass 11 times compared to 75 times in the one year period prior to closure (July 2007 through June 2008). St. James Olympia Fields Hospital went on bypass an average of once every two months since the closure of their trauma unit. The average bypass duration was 5 hours before the closure, compared to 4 hours after closure.

In contrast, during the one year prior to Olympia Fields closure of its trauma unit, Advocate Christ was on bypass for an average of 9.8 days per month, and this increased to an average of 13.3 days per month after the closure (through July 2011). The average duration of bypass time prior to Olympia Fields closure of its trauma unit was 4 hours and 36 minutes compared to 4 hours and 14 minutes after the closure. By comparison, Mt Sinai Hospital goes on bypass approximately one time per month, for a duration of 5 to 6 hours each time. In contrast, the University of Chicago is on bypass nearly every day of the year, averaging 30 times per month with an average bypass time of 6 hours and 18 minutes for each event.

Were there any detrimental changes following the closure of the St. James Olympia Fields Hospital trauma unit in terms of deaths, number of patients requiring mechanical ventilation, patients with medical complications, number of patients discharged to an intermediate care facility, days of hospitalization or total hospital charges?

There was no association between the closure of the St. James Olympia Fields Hospital trauma unit and an increase in in-hospital deaths or the likelihood of a patient being discharged to an intermediate care facility (Table 8). Intermediate care facilities include rehabilitation centers, nursing homes, skilled nursing facilities, hospice centers and other undefined facilities. There was also no association between complications as a result of traumatic injury and the closure of the trauma unit. The trauma complications were analyzed collectively and individually. The trauma complications included in the analysis were general complications with ICD-9-CM codes of 958 to 959, poisoning during the course of medical treatment, acute posthemorrhagic anemia, cerebral edema/anoxia/encephalopathy, hypotensive shock, pulmonary insufficiency as a result of trauma, acute respiratory failure, and septicemia.

There was a significant increase in the odds of a patient requiring mechanical ventilation after the closure of the St James Olympia Fields Hospital trauma unit among patients coming from area 1 of the Olympia Fields catchment area (adjusted OR =1.58; CI95%: 1.10, 2.26). Based on the regression model, the predicted probability that a patient would require mechanical ventilation rose from 5.3% to 8.9% among those coming from area 1. When we used only patient records from the trauma registry, there was also a significant association between mechanical ventilation and the closure of the trauma unit among patients coming from area 3 (Table 8).

Patients from area 1 and 3 showed a significant increase in their total length of hospitalization after the closure of the St. James Olympia Fields trauma unit, although the increases were modest. However, the average increase was less substantial among patients coming from area 3 (increase of 0.22 days; approximately 5 hours longer stay) than from area 1 (increase of 0.41 days; approximately 10 hours longer stay). (Table 9) Hospital charges showed a slight but significant decline after the closure of the trauma unit among patients from areas 1 and 2. Trauma patients treated in any of the 30 hospitals included in this study did not have a significant change in total charges after July 2008, despite .

Among the hospitals with trauma units most affected by the closing of Olympia Fields – specifically Advocate Christ Hospital -- has there been an increase in adverse effects among the patients treated in these facilities?

It is conceivable that in facilities overburdened by excess patient volume because of the closure of St James Olympia Fields Hospital trauma unit, trauma teams would be activated for a lower proportion of patients because their resources are over extended. Advocate Christ Hospital did go on bypass more frequently after the closure of the Olympia Fields trauma unit, but the duration of the bypass times decreased. In addition, Christ Hospital increased staffing by eight trauma surgeons, in part to address an increase in patient volume as a result to the changes in the trauma system. However, the staffing increase was also in response to an expansion the type of trauma services Advocate Christ Hospital provides. It was also reported that even when Advocate Christ Hospital goes on bypass, it accepts severely injured cases that have only neurosurgical needs. These patients are admitted directly to the neurosurgical intensive care unit. In our analysis of patients treated at Advocate Christ Hospital, more patients required mechanical ventilation (adjusted OR=1.61; CI95%: 1.25, 2.09; $p<0.001$) and the length of stay was slightly longer after July 1, 2008 (increase of 0.17 days; CI95%: 0.02, 0.32; $p=0.032$). Among those transferred from the Olympia Fields catchment area to Advocate Christ Hospital, we found no evidence of a negative effect across any of the key outcome measures, except that hospital charges were higher among persons transferred after the closure of the St. James trauma unit (increase of \$2,284; CI95%: 540, 4028).

CONCLUSION

Although there were no immediate adverse effects, Advocate Christ Hospital has picked up the majority of seriously injured patients that previously would have been treated at Olympia Fields. Advocate Christ Hospital is the only facility with specialized trauma care within the Southern Cook County area. The system is not static, population shifts and changes to factors that are associated with injury -- traffic patterns, poverty, crime, and aging populations -- may result in long term effects missed by this analysis. The Project Management Team for this study recommends the following policy changes to improve and safeguard the regional trauma system in Southern Cook County:

1. Create a centralized ambulance service in Southern Cook County - Many of the communities in Southern Cook County have very limited resources to provide adequate pre-hospital care to persons injured within their cities. St. James Olympia Fields Hospital staff has reported to us that many ambulance services continue to bring acutely injured patients to St. James Olympia Fields and Chicago Heights Hospitals. This is occurring because many of the ambulance services of towns in the most southern section of Cook County are reluctant to transport patients so far north to Advocate Christ, West to Silver Cross, or south to Kankakee Hospital. These long transport times often means an ambulance unit is unavailable for other services for more than 2 hours. Therefore, many ambulance services are transporting patients to St. James Olympia Fields or Chicago Heights Hospitals to be stabilized, and then these patients are primarily being transferred to Advocate Christ Hospital. A centralized ambulance service would ensure that resources are equitably and efficiently distributed among the Southern Cook County communities. A centralized system could be (1) owned and managed by the county, (2) a co-op funded by cities on the southside, or (3) a hybrid system that creates a centralized management group to oversee a private/public ambulance system.

2. Develop pathways to facilitate coordination and planning between hospitals with specialized trauma units independent of trauma region - Currently, Advocate Christ Hospital is the primary facility treating persons suffering serious injuries in Southern Cook County. Ongoing population shifts may increase the frequency in which Advocate Christ Hospital is unable to treat all injured patients seeking treatment at their facility. Coordination and planning between facilities with existing specialized trauma units, independent of trauma region, may help reduce or prevent disruptions in trauma care.

3. Create a system in Illinois to designate hospitals as level III and IV trauma units - Approximately half of all acutely injured persons in Illinois are treated at hospitals without specialized trauma care. Many hospitals are currently acting as de facto level III trauma facilities (i.e. a facility used to stabilize patients before transfer to a higher level trauma unit). Most hospitals coordinate and communicate with other hospitals within and outside their EMS region, regardless of whether they have specialized trauma teams. A hospital does not have to be part of an EMS region to be able to access the regional trauma committee. However, creating a support structure to facilitate and enhance the integration of hospitals without specialized trauma units into regional trauma systems would (1) improve inter-hospital coordination by facilitating communication between hospitals (2) bring more active partners to the table, (3) and identify trauma training needs at Level III or IV facilities. Additionally, by certifying hospitals as level III/IV facilities, policy makers will be able to inform local constituencies about trauma resources

that are generally unrecognized within their communities (i.e. nearby community hospitals that provide trauma care). Expansion of the existing trauma system and providing adequate training requires an increase of financial and administrative support by the State to both hospitals with specialized trauma units and hospitals caring for trauma patients without a recognized/certified trauma team. Without cost sharing arrangements and administrative support from IDPH, any move to expand the current trauma system will likely be resisted by many hospitals.

4. Continued active surveillance of the long term impact of closing the Saint James

Olympia Fields Hospital Trauma Center - The current analysis is restricted to the evaluation of the immediate impact of closing the St. James Olympia Fields Hospital trauma unit. However, the system is not static, population shifts and changes to factors that are associated with injury -- traffic patterns, poverty, crime, aging populations -- may result in long term effects missed by this analysis. As part of an ongoing surveillance program, an annual report should be generated on this issue using the data sources made available for this analysis. Developing an annual forum to share and discuss the annual report with trauma directors within Cook County and the surrounding region would be an important element of the proposed ongoing surveillance program. This will enable trauma directors to improve coordination and planning. As part of developing an ongoing injury surveillance program in Cook County, it is important to work closely with the State and other important partners to ensure that the data required for the surveillance program is easily accessible. The Emergency Medical System Pre-Hospital database, the Illinois Trauma Registry and the Hospital Discharge database are critical to examining factors that inform and provide evidence for decision making on issue of trauma care. One major barrier is that the Chicago Fire Department stopped reporting to the state Emergency Medical System Pre-Hospital database in 2006. Because of the importance of the data, the Chicago Fire Department should be compelled to report to the State all of its EMS prehospital run data. Furthermore, EMS reporting should be carefully evaluated statewide to improve completion of data fields so that the Emergency Medical System Pre-Hospital database can be better utilized for system evaluations such as this report.

**Table 8: Association Between Adverse Outcomes and the Closure of the St. James Olympia Fields Trauma Unit
In-Hospital Deaths, Mechanical Ventilation, and Discharge Status**

Model	N=	All ZIP Codes^a Adjusted Odds Ratio* (CI95%)	P-value	ZIP Code by Scene Only^b Adjusted Odds Ratio* (CI95%)	P-value
In-Hospital Deaths					
Patients not in catchment area	130126	1.09 (0.95, 1.24)	0.219	1.05 (0.91, 1.21)	0.501
Area 1	12116	0.76 (0.47, 1.25)	0.278	0.73 (0.27, 1.93)	0.519
Area 2	11879	0.91 (0.56, 1.49)	0.718	0.99 (0.45, 2.20)	0.989
Area 3	11724	0.84 (0.55, 1.28)	0.413	1.01 (0.43, 2.39)	0.982
Required Mechanical Ventilation					
Patients not in catchment area	130126	0.99 (0.90, 1.08)	0.751	1.11 (1.01, 1.23)	0.036
Area 1	12116	1.58 (1.10, 2.26)	0.013	2.53 (1.27, 5.04)	0.009
Area 2	11879	1.46 (0.99, 2.17)	0.057	1.71 (0.89, 3.28)	0.110
Area 3	11724	1.34 (0.97, 1.84)	0.075	2.47 (1.32, 4.64)	0.005
Discharged to Intermediate Care Facility^c					
Patients not in catchment area	130126	1.02 (0.97, 1.08)	0.397	1.00 (0.94, 1.06)	0.982
Area 1	12116	1.12 (0.95, 1.32)	0.196	1.19 (0.71, 1.99)	0.514
Area 2	11879	0.91 (0.76, 1.08)	0.258	1.05 (0.76, 1.44)	0.773
Area 3	11724	1.06 (0.90, 1.24)	0.522	0.97 (0.61, 1.55)	0.890

aAreas (1-3) are defined by using both residence and scene of injury ZIP codes. ZIP codes for scene of injury were only available for patients with trauma registry records. For patients with only hospital discharge records we used patient residential ZIP code.

bAreas (1-3) are defined by using only scene of injury ZIP codes. This only includes patients with trauma registry records.

cIntermediate care facilities include hospices, rehabilitation centers, nursing homes, skilled nursing facilities, other undefined intermediate care facilities.

**Table 9: Association Between Adverse Outcomes and the Closure of the St. James Olympia Fields Trauma Unit
Length of Hospital Stay and Total Hospital Charges (\$USD)**

		All ZIP Codes ^a		ZIP Code by Scene Only ^b	
Model	N=	Adjusted Parameter Estimate* (CI95%)	P-value	Adjusted Parameter Estimate* (CI95%)	P-value
Length of Stay (Days of Hospitalization)					
Patients not in catchment area	130126	0.08 (0.03, 0.12)	0.001	0.05 (0.00, 0.10)	0.071
Area 1	12116	0.41 (0.24, 0.58)	<0.001	0.47 (0.21, 0.73)	0.001
Area 2	11879	0.05 (-0.11, 0.20)	0.539	0.08 (-0.13, 0.28)	0.466
Area 3	11724	0.22 (0.06, 0.39)	0.009	0.37 (0.05, 0.70)	0.025
Total Hospital Charges (USD\$)					
Patients not in catchment area	130126	-2.51 (-216.73, 211.72)	0.982	26.63 (-197.65, 250.91)	0.816
Area 1	12116	-633.84 (-1184.12, -83.56)	0.024	-3708.79 (-5024.49, -2393.10)	<.0001
Area 2	11879	-888.14 (-1463.04, -313.24)	0.003	-1570.14 (-2392.91, -747.36)	<.0001
Area 3	11724	-51.45 (-640.30, 537.40)	0.864	-2812.61 (-4182.86, -1442.36)	<.0001

*Adjusted model controls for trend, age, gender, length of stay, injury severity (NISS), Charlson Comorbidity Index, trauma complications, penetrating injuries, surgical intervention, penetrating injuries and mechanical ventilation.

aAreas (1-3) are defined by using both residence and scene of injury ZIP codes. ZIP codes for scene of injury were only available for patients with trauma registry records. For patients with only hospital discharge records we used patient residential ZIP code.

bAreas (1-3) are defined by using only scene of injury ZIP codes. This only includes patients with trauma registry records.

Citations

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Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. *J Chronic Dis* 1987; 40(5):373-383.

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Cook County Health and Hospitals System
Minutes of the Quality and Patient Safety Committee Meeting
January 17, 2012

ATTACHMENT #5

John H. Stroger, Jr. Hospital of Cook County



Medical Staff Appointments/Reappointments and Non-Medical Staff Action Items Subject to Approval by the CCHHS Quality and Patient Safety Committee

INITIAL APPOINTMENT APPLICATIONS

Diven, Thomas, MD Appointment Effective:	Surgery/General January 17, 2012 thru January 16, 2014	Voluntary Physician
McFarland, Daniel, MD Appointment Effective:	Psychiatry January 17, 2012 thru January 16, 2014	Active Physician
Siddiqi, Alvia, MD Appointment Effective:	Family Medicine January 17, 2012 thru January 16, 2014	Active Physician

REAPPOINTMENT APPLICATIONS

Department of Medicine

Ciftci, Ferah D., MD Reappointment Effective:	Hospital Medicine February 16, 2012 thru February 15, 2014	Active Physician
Dworkin, Mark. S, MD Reappointment Effective:	Infectious Disease February 16, 2012 thru February 15, 2014	Consulting Physician
Frellsen, Sandra, L., MD Reappointment Effective:	General Medicine February 20, 2012 thru February 19, 2014	Active Physician
Mc Dermott, Michael, F., MD Reappointment Effective:	Pulmonary January 17, 2012 thru January 15, 2014	Voluntary Physician
Pulvirenti, Joseph J., MD Reappointment Effective:	Infectious Disease February 19, 2012 thru February 18, 2014	Affiliate Physician

Department of Pediatrics

Kamat, Medha, MD Reappointment Effective:	Neonatology March 20, 2012 thru March 19, 2014	Active Physician
Sandler, Richard, MD Reappointment Effective:	Gastroenterology January 23, 2012 thru January 22, 2014	Voluntary Physician

Department of Surgery

Sierens, Diane, MD Reappointment Effective:	Neurosurgery February 20, 2012 thru February 19, 2014	Active Physician
Sriram, Krishnan, MD Reappointment Effective:	Surgical Critical Care February 19, 2012 thru February 18, 2014	Active Physician

John H. Stroger, Jr. Hospital of Cook County (continued)

Non-Medical Staff Renewal of Privileges

Aschkenasy, Jeannie, PhD	Psychiatry/Child Adolescent	Clinical Psychologist
Reappointment Effective:	January 19, 2012 thru January 18, 2014	

Nwigwe, Joy C., CNP	Medicine	Nurse Practitioner
With Franco-Sadud, Richardo A., MD		
Reappointment Effective:	January 19, 2012 thru January 18, 2014	

Provident Hospital of Cook County



Medical Staff Appointment, Reappointments and Non-Medical Staff Action Items Subject to Approval by the CCHHS Quality and Patient Safety Committee

INITIAL APPOINTMENT APPLICATION

Non-Medical Staff Initial Privileges:

Healy, Kristine M., PA-C	Family Medicine	Physician Assistant
With Lipkin, Julie, MD		
Alternate Barnes, Laverne, M., DO		
Appointment Effective:	January 17, 2012 thru January 16, 2014	

REAPPOINTMENT APPLICATION

Mackie, Orlanda, MD	Internal Medicine	Consulting Physician
Reappointment Effective:	February 16, 2012 thru February 15, 2014	

MEDICAL STAFF CHANGE WITH NO CHANGE IN CLINICAL PRIVILEGE

Michael Escoto, DO	Emergency Medicine	From: Affiliate Physician To: Active Physician
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